

FACULTY OF SCIENCES

SYLLABUS

of

Bachelor of Science (Honours)

Mathematics (Semester: I -VI)

(Under Continuous Evaluation System)

Session: 2022-23



The Heritage Institution

**KANYA MAHA VIDYALAYA
JALANDHAR**

(Autonomous)

Programme Specific Outcomes

Upon successful completion of this course, students will be able to:

PSO1: Solve complex Mathematical problems by critical understanding, analysis and synthesis. Students will also be able to provide a systematic understanding of the concepts and theorem of Mathematics and their applications in the real world to an advanced level, enhance career prospects in a huge array of field suitable to succeed at an entry level position in Mathematics post graduate program.

PSO2: Demonstrate proficiency in Mathematics and the Mathematical concepts needed for a proper understanding of Physics, Chemistry, Electronics, Computer Science and Economics.

PSO3: Create and develop Mathematical software application using a systematic approach & apply discrete Mathematical concept to practical application.

PSO4: Demonstrate knowledge of Calculus I & II, Matrices and Theory of Equations, Analytical and Solid Geometry, Statics & Tensor Calculus and able to apply this knowledge to analyze a variety of Mathematical Phenomena.

PSO5: Demonstrate knowledge of physical chemistry & apply this knowledge to analyze a variety of chemical phenomena & will be able to interpret and analyze quantitative data.

PSO6: Understand and demonstrate the knowledge of Mechanics, area, volume and displacement with differential equation of the orbit.

PSO7: Understand the basic concepts and basic principles of Demand and Supply, Measurement of Price Elasticity of Demand and apply Economic theories to derive cost function from Production Function.

PSO8: Learn implications of Revenue curves and their mutual relationships.

PSO9: Develop statistical approach and mathematical thinking among students to problem solving on a diverse variety of disciplines.

PSO10: Have knowledge of computer fundamentals, able to handle practical programming problems using C and analyze large volume of data using various statistical techniques

Scheme and Curriculum of Examinations of Three Year Degree Programme

Bachelor of Science (Honours) Mathematics Semester-I

Session- 2022-23

Bachelor of Science (Honours) Mathematics Semester-I							
Course Code	Course type	Course Title	Max.Marks				Examination time in hours
			Total	Ext.		CA	
				L	P		
BOML-1421/ BOML-1031/ BOML-1431	C	Punjabi (Compulsory)/ ¹ Basic Punjabi/ ² Punjab History and Culture	50	40	-	10	3
BOML-1102	C	Communication Skills in English	50	40	-	10	3
BOML-1333	C	Calculus-I	100	80	-	20	3
BOML-1334	C	Coordinate Geometry	100	80	-	20	3
BOMM-1085	C	⁴ Physical Chemistry	100	60	20	20	3+3.5
OR		OR					
BOML-1175	C	³ Micro Economics-I	100	80	-	20	3
BOML-1336	C	³ Statics	100	80	-	20	3
OR		OR					
BOMM-1396	C	⁴ Mechanics	100	60	20	20	3+3
AECD-1161	AC	* Drug Abuse: Problem, Management and Prevention (Compulsory)	50	40	-	10	3
SECF-1492	AC	* Foundation Course	25	20	-	5	1
Total Marks			500				

Note:

¹ Special Course in lieu of Punjabi (Compulsory)² Special Course in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.³ Only those students can opt these courses who have not studied Chemistry at +2 level.⁴ Only those students can opt these courses who have studied Chemistry at +2 level.

* Marks of these papers will not be added in total marks. Grades will be provided.

C-Compulsory

AC-Audit Course

**BACHELOR OF SCIENCE (HONOURS) MATHEMATICS/ BACHELOR OF ARTS (HONOURS)
ENGLISH/ BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER-I**

COURSE CODE- BOEL/BOML/BOPL-1421

COURSE OUTCOMES

Co1: 'ਸਾਹਿਤ ਦੇ ਰੰਗ' ਪੁਸਤਕ ਦੇ ਕਵਿਤਾ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਵਿਤਾ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚਲ ਰਹੀਆਂ ਕਾਵਿਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਲ ਕਰ ਸਕਣ। ਇਸ ਦਾ ਹੋਰ ਮਨੋਰਥ ਕਵਿਤਾ ਦੀ ਵਿਆਖਿਆ, ਵਿਸ਼ਲੇਸ਼ਣ ਤੇ ਮੁਲਾਂਕਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ ਵੀ ਹੈ ਤਾਂਕਿ ਉਹ ਸਮਕਾਲੀ ਸਮਾਜ ਦੀਆਂ ਸਮੱਸਿਆਵਾਂ ਨੂੰ ਸਮਝ ਸਕਣ ਅਤੇ ਆਲੋਚਨਾਤਮਕ ਦ੍ਰਿਸ਼ਟੀ ਬਣਾ ਸਕਣ।

Co2: 'ਸਾਹਿਤ ਦੇ ਰੰਗ' ਪੁਸਤਕ ਦੇ ਕਹਾਣੀ ਭਾਗ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਕਹਾਣੀ ਜਗਤ ਨਾਲ ਜੋੜਣਾ ਹੈ।

Co3: ਪੈਰਾ ਰਚਨਾ ਅਤੇ ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ ਦੇਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

Co4: ਧੁਨੀ ਵਿਉਂਤ ਪੜ੍ਹਣ ਨਾਲ ਵਿਦਿਆਰਥੀ ਧੁਨੀਆਂ ਦੀ ਉਚਾਰਨ ਪ੍ਰਣਾਲੀ ਤੋਂ ਵਾਕਫ਼ ਹੋਣਗੇ।

Punjabi (Compulsory)

BACHELOR OF SCIENCE (HONOURS) MATHEMATICS/ BACHELOR OF ARTS (HONOURS)
ENGLISH/ BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER-I

COURSE CODE- BOEL/BOML/BOPL-1421

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50

Theory : 40

CA :10

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ
ਯੂਨਿਟ-I

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾਮਹਿਲਸਿੰਘ), ਭਾਗਪਹਿਲਾ (ਕਵਿਤਾ),
ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਸਾਰ, ਵਿਸ਼ਾ ਵਸਤੂ)
(ਡਾ.ਹਰਿਭਜਨ ਸਿੰਘ, ਪਾਸ਼, ਸੁਰਜੀਤ ਪਾਤਰ ਕਵੀ ਪਾਠ ਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹਨ) 8 ਅੰਕ

ਯੂਨਿਟ-II

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾ ਮਹਿਲ ਸਿੰਘ), ਭਾਗ ਪਹਿਲਾ (ਕਹਾਣੀ),
ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
(ਸਾਰ, ਵਿਸ਼ਾ ਵਸਤੂ)
(ਕੋਈ ਇਕ ਸਵਾਰ, ਘੋਟਣਾ, ਆਪਣਾ ਆਪਣਾ ਹਿੱਸਾ ਕਹਾਣੀਆਂ ਪਾਠ ਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹਨ) 8 ਅੰਕ

ਯੂਨਿਟ-III

ਪੈਰਾਚਰਨਾ

ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪਸ਼ੂਨਾਂ ਦੇ ਉਤਰ। 8 ਅੰਕ

ਯੂਨਿਟ-IV

(ੳ) ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ : ਪਰਿਭਾਸ਼ਾ ਤੇ ਉਚਾਰਨ ਅੰਗ

(ਅ) ਸਵਰ, ਵਿਅੰਜਨ 8 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION/BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION) / BACHELOR OF SCIENCE (FASHION DESIGNING) / BACHELOR OF SCIENCE. (HOME SCIENCE) / BACHELOR OF COMPUTER APPLICATIONS/BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)/ BACHELOR OF SCIENCE (BIO-TECHNOLOGY)/ BACHELOR OF SCIENCE (HONOURS)MATHEMATICS/ BACHELOR OF ARTS (HONOURS) ENGLISH/BACHELOR OF COMMERCE (HONOURS) BACHELOR OF SCIENCE (HONOURS) PHYSICS SEMESTER-I

BASIC PUNJABI

In lieu of Punjabi(Compulsory)

**COURSE CODE -BARL/BSML/BSNL/BCSL/BECL/BCRL/BBRL/BJML/BFDL/
BHSL/BCAL/BITL/BBTL/BOML/BOEL/BCOL/BOPL-1031**

Course outcomes

CO1:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਿਖਾਉਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਪਾ ਕੇ ਇਕ ਹੋਰ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦਾ ਮੌਕਾ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ।

CO2:ਇਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਬਾਰੀਕਬੀਨੀ ਨਾਲ ਭਾਸ਼ਾ ਦਾ ਅਧਿਐਨ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO3:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO4:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਦੱਸਣਾ ਹੈ।

CO5:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦਾ ਸ਼ਬਦ ਘੇਰਾ ਵਿਸ਼ਾਲ ਕਰਨਾ ਹੈ।

CO6:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਵਿਚ ਹਫ਼ਤੇ ਦੇ ਸੱਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਂ, ਇਕ ਤੋਂ ਸੌ ਤੱਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿਚ ਸਿਖਾਉਣਾ ਹੈ।

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION/BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION) / BACHELOR OF SCIENCE (FASHION DESIGNING) / BACHELOR OF SCIENCE. (HOME SCIENCE) / BACHELOR OF COMPUTER APPLICATIONS/BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)/ BACHELOR OF SCIENCE (BIO-TECHNOLOGY)/BACHELOR OF SCIENCE (HONOURS)MATHEMATICS/ BACHELOR OF ARTS (HONOURS) ENGLISH/BACHELOR OF COMMERCE (HONOURS) BACHELOR OF SCIENCE (HONOURS) PHYSICS SEMESTER-I

BASIC PUNJABI

In lieu of Punjabi(Compulsory)

COURSE CODE -BARL/BSML/BSNL/BCSL/BECL/BCRL/BBRL/BJML/BFDL/
BHSL/BCAL/BITL/BBTL/BOML/BOEL/BCOL/BOPL-1031

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50

Theory : 40

CA : 10

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ, ਪੈਰ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ ਅਤੇ ਮਾਤ੍ਰਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ।

08ਅੰਕ

ਯੂਨਿਟ-II

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ (ਸਾਧਾਰਨ ਸ਼ਬਦ, ਸੰਯੁਕਤ ਸ਼ਬਦ, ਮਿਸ਼ਰਤ ਸ਼ਬਦ, ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ)

08ਅੰਕ

ਯੂਨਿਟ-III

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਿਬਤੇ ਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰ ਧੰਦਿਆਂ ਆਦਿ ਨਾਲ ਸੰਬੰਧਤ।

08 ਅੰਕ

ਯੂਨਿਟ-IV

ਹਫ਼ਤੇ ਦੇ ਸੱਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਂ, ਇਕ ਤੋਂ ਸੌ ਤਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂਵਿਚ ।

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

Bachelor of Arts/ Bachelor of Science (Medical) / Bachelor of Science (Non Medical) / Bachelor of Science(Honours) Maths/ Bachelor of Science (Honours) Physics/Bachelor of Science (Computer Science) / Bachelor of Science (Economics) / Bachelor of Commerce / Bachelor of Business Administration/ Bachelor of Arts (Journalism & Mass Communication) / Bachelor of .Science (Fashion Design) / Bachelor of Science (Home Science) / /Bachelor of Computer Application /Bachelor of Science(Information Technology)/ Bachelor of Science (Bio Technology) / Bachelor of Arts (Honours.)English

(Semester-I)

Session 2022-23

**Course Title: Punjab History and Culture (From Earliest Times to C 320) (Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)**

Course Code: BARL-1431/ BSML-1431/ BSNL-1431/ BOML-1431/ BOPL-1431/ BCSL-1431/ BECL-1431/ BCRL-1431/ BBRL-1431/ BJML-1431/ BFDL-1431/ BHSL-1431/ BCAL-1431/ BITL-1431 / BBTL-1431/BOEL-1431

COURSE OUTCOMES

After completing Semester I and course on Punjab History and Culture students of History will be able to identify and have a complete grasp on the sources & writings of Ancient Indian History of Punjab.

CO1: Identify and describe the emergence of earliest civilizations in: Indus Valley Civilization and Aryan Societies.

CO2: Identify and analyses the Buddhist, Jain and Hindu faith in the Punjab

CO3: Analyses the emergence of Early Aryans and Later Vedic Period, their Society, Culture, Polity and Economy

CO4: To make students understand the concepts of two faiths Jainism and Buddhism, its principles and their application and relevance in present times

Bachelor of Arts/ Bachelor of Science (Medical) / Bachelor of Science (Non Medical) / Bachelor of Science(Honours) Maths/ Bachelor of Science (Honours) Physics/Bachelor of Science (Computer Science) / Bachelor of Science (Economics) / Bachelor of Commerce / Bachelor of Business Administration/ Bachelor of Arts (Journalism & Mass Communication) / Bachelor of .Science (Fashion Design) / Bachelor of Science (Home Science) / /Bachelor of Computer Application /Bachelor of Science(Information Technology)/ Bachelor of Science (Bio Technology) / Bachelor of Arts (Honours.)English

(Semester-I)

Session 2022-23

**Course Title: Punjab History and Culture (From Earliest Times to C 320) (Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)**

Course Code: BARL-1431/ BSML-1431/ BSNL-1431/ BOML-1431/ BOPL-1431/ BCSL-1431/

BECL-1431/ BCRL-1431/ BBRL-1431/ BJML-1431/ BFDL-1431/ BHSL-1431/ BCAL-1431/

BITL-1431 / BBTL-1431/BOEL-1431

Examination Time: 3 Hours

Max. Marks: 50

Theory: 40

C A: 10

Instructions for the Paper Setters

1. Question paper shall consist of four Units
2. Examiner shall set 8 questions in all by selecting **Two Questions** of equal marks from each Unit.
3. Candidates shall attempt **5 questions** in **600 words**, by at least selecting **One Question** from each Unit and the **5th question** may be attempted from any of the **four Units**.
4. Each question will carry 8 marks.

Unit-I

1. Physical features of the Punjab
2. Sources of the ancient history of Punjab

Unit-II

3. Harappan Civilization: social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home

Unit-III

5. Social, Religious and Economic life during Early Vedic Age.
6. Social, Religious and Economic life during Later Vedic Age.

UNIT-IV

7. Teachings of Buddhism
8. Teachings of Jainism

Suggested Readings

- L. M Joshi (ed.), *History and Culture of the Punjab*, Art-I, Patiala, 1989 (3rd edition)
- L.M. Joshi and Fauja Singh (ed.), *History of Punjab*, Vol.I, Patiala 1977.
- Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
- B.N. Sharma, *Life in Northern India*, Delhi. 1966.
- Chopra, P.N., Puri, B.N., & Das, M.N.(1974). *A Social, Cultural & Economic History of India*, Vol. I, New Delhi: Macmillan India.

BACHELOR OF VOCATION (RETAIL MANAGEMENT) / BACHELOR OF VOCATION (MANAGEMENT & SECRETARIAL PRACTICES)/ BACHELOR OF VOCATION (ANIMATION)/ BACHELOR OF VOCATION (TEXTILE DESIGN & APPAREL TECHNOLOGY)/ BACHELOR OF VOCATION (NUTRITION EXERCISE & HEALTH)/ BACHELOR OF VOCATION (BEAUTY AND WELLNESS)/BACHELOR OF VOCATION (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)/ BACHELOR OF VOCATION (HOSPITALITY AND TOURISM)

(Semester I)

Session 2022-23

COMMUNICATION SKILLS IN ENGLISH

(Theory)

Course Code: BJML/BFDL/BHSL/BCAL/BITL/

BBTL /BOML/BOPL/BVRL/BVML/BVAL/BVTL/BVNL/BVBL / BVAI/BVHL-1102

COURSE OUTCOMES

At the end of this course, the students will develop the following Skills:

CO 1: Reading skills that will facilitate them to become an efficient reader

CO 2: Through reading skills, the students will have an ability to have a comprehensive understanding of the ideas in the text and enhance their critical thinking

CO 3: Writing skills of students which will make them proficient enough to express ideas in clear and grammatically correct English

CO 4: The skill to use an appropriate style and format in writing letters (formal and informal) and resume, memo, notices, agenda, minutes

BACHELOR OF VOCATION (RETAIL MANAGEMENT) / BACHELOR OF VOCATION (MANAGEMENT & SECRETARIAL PRACTICES)/ BACHELOR OF VOCATION (ANIMATION)/ BACHELOR OF VOCATION (TEXTILE DESIGN & APPAREL TECHNOLOGY)/ BACHELOR OF VOCATION (NUTRITION EXERCISE & HEALTH)/ BACHELOR OF VOCATION (BEAUTY AND WELLNESS)/BACHELOR OF VOCATION (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)/ BACHELOR OF VOCATION (HOSPITALITY AND TOURISM)

(Semester I)

Session 2022-23

COMMUNICATION SKILLS IN ENGLISH

(Theory)

Course Code: BJML/BFDL/BHSL/BCAL/BITL/

BBTL /BOML/BOPL/BVRL/BVML/BVAL/BVTL/BVNL/BVBL / BVAI/BVHL-1102

Examination Time: 3 Hrs

Total Marks: 50

Theory: 40

CA: 10

Instructions for the paper setter and distribution of marks:

The question paper will consist of four sections. The candidate will have to attempt five questions in all selecting one from each section and the fifth question from any of the four sections. Each question will carry 8 marks.

Section-A: Two questions of theoretical nature will be set from Unit I.

Section-B: Two comprehension passages will be given to the students from Unit II.

Section-C: Two questions will be given from Unit III.

Section-D: Two questions will be set from Unit IV.

The syllabus is divided in four units as mentioned below:

Unit I

Reading Skills: Reading Tactics and strategies; Reading purposes—kinds of purposes and associated comprehension; Reading for direct meanings.

Unit II

Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:

- Comprehension questions in multiple choice format
- Short comprehension questions based on content and development of ideas

Unit III

Writing Skills: Guidelines for effective writing; writing styles for application, personal letter, official/ business letter.

Activities

- Formatting personal and business letters.
- Organizing the details in a sequential order

Unit IV

Resume, memo, notices, agenda, minutes, Tips for effective blog writing

Activities:

Converting a biographical note into a sequenced resume

or vice-versa

- Ordering and sub-dividing the contents while making notes.
- Writing notices for circulation/boards
- Writing blogs

Recommended Books:

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
2. *Business Communication*, by Sinha, K.K. Galgotia Publishers, 2003.
3. *Business Communication* by Sethi, A and Adhikari, B., McGraw Hill Education 2009.
4. *Communication Skills* by Raman, M. & S. Sharma, OUP, New Delhi, India (2011).

Bachelor of Science (Honours) Mathematics
Semester-I
Session- 2022-23
Course Title: Calculus-I
Course Code: BOML-1333

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand real number system, lub & glb of set of real numbers, limit of a function, basic properties of limit, continuity, and classification of discontinuities & to apply it in real world problem.

CO 2: To Classify the difference between increasing and decreasing functions and understand the concept of Differentiability of functions and maxima & minima.

CO 3: Demonstrate Asymptotes, points of inflexion, multiple points on a curve & also to differentiate between concavity and convexity & hence tracing of curve.

CO 4: To understand the concepts of Riemann sum, definite integrals and their properties, the fundamental theorem of calculus, applications to length of arc and area bounded between curves, Reduction Formulae & to apply in a wide variety of disciplines like Bio, Eco, Physics & Engineering.

Bachelor of Science (Honours) Mathematics
Semester-I
Session-2022-23
Course Title: Calculus-I
Course Code: BOML-1333

Examination Time: 3 Hours

Max. Marks: 100

Theory: 80

CA:20

Instructions for Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Real line, intervals, l.u.b. and g.l.b., the l.u.b. property of real numbers and order properties of real numbers, Archimedean property, definition of the limit of a function of real variable, algebra of limits, continuity, classification of discontinuities

Unit II

Differentiability of functions of real variable, increasing and decreasing functions, maxima and minima, mean values theorems

Unit III

Intermediate-value theorems, Asymptotes, concavity and convexity, points of inflexion, curve tracing.

Unit IV

Anti derivative of function of real variable, Riemann sums, definite integrals and their properties, the fundamental theorem of calculus, applications to length of arc and area bounded between curves, Reduction Formulae.

Text Book:

George B. Thomas and Ross L. Finney, Calculus and Analytic Geometry, Pearson publication, 9th Edition, 1998.

Reference Books:

1. A.D.R. Choudary and C.P. Niculescu, Real Analysis on Intervals, Springer, 2014.
2. E. Kreyszig, Advanced Engineering Mathematics, Wiley Publication, 10th Edition, 2011.
3. Sudhir R. Ghorpade and B.V. Limaye, A course in calculus and real analysis, Springer, 2006.

Bachelor of Science (Honours) Mathematics
Semester-I
Session- 2022 -23
Course Title: Coordinate Geometry
Course Code: BOML-1334

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of the geometry of lines in the Euclidian plane. Additionally, they will be able to develop geometry with a degree of confidence and will gain fluency in the basics of 2-d geometry.

CO 2: Gain deeper insight in core concepts and geometry related to circles including wider characteristics like tangent, normal, radical axis etc.

CO 3: Demonstrate the concept of parabola, ellipse, hyperbola and the general quadratic equation; and sketch conic sections, identify conic sections, their focal properties and classifications.

CO 4: Understand the concept of coordinate geometry on a wider scale with the help of shifting of origin and rotation of axis.

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

Unit I

Pair of Straight lines: Joint equation of pair of straight lines and angle between them, condition of parallelism and perpendicularity, joint equation of the angle bisectors, joint equation of lines joining origin to the intersection of a line and a curve.

Unit II

Circle: General equation of circle, circle through intersection of two lines, tangent and normal, Chord of contact, pole and polar, pair of tangents from a point, equation of chord in midpoint form, angle of intersection and orthogonality, power of a point w.r.t circle, radical axis, co-axial family of circles, limiting points.

Unit III

Conic sections: Parabola, ellipse and hyperbola, tangent and normal, chord of contact, pole and polar of tangent from a point, equation of chord in terms of midpoint, diameter, conjugate diameters of ellipse and hyperbola, conjugate hyperbola, asymptotes of hyperbola, rectangular hyperbola.

Unit IV

Transformation of axes in two dimensions: shifting of origin, rotation of axes, the second degree equation $S = ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$, its invariants t , Δ , and O . Reduction of the second degree equation into standard form. Identification of curves represented by $S = 0$ (including pair of lines). Polar coordinates: Polar equations of straight lines, circles and conics.

Text Book:

S.L. Loney, The elements of Coordinate Geometry, London: Macmillan, 11 th edition, 1965.

Reference Book:

P.K Jain and K. Ahmed, Text book of Analytical Geometry, New Age International Publishers, 3rd edition, 2014

Bachelor of Science (Honours) Mathematics
(Semester-I)
Session: 2022-23
Course Title: Physical Chemistry Course
Course Code: BOMM-1085

Course outcomes:

Students will be able to:

CO1: understand the various thermodynamic properties and laws of Thermodynamics, acquire knowledge about the various thermodynamic terms like enthalpy of formation, enthalpy of ionisation, entropy, internal energy

CO2: calculate entropy change for reversible and irreversible processes under isothermal and non-isothermal conditions and also absolute entropies of substances

CO3: understand the relation between free energy change and equilibrium constants K_p , K_c and K_f : describe the Phases and Phase rule and its thermodynamic derivation

CO4: draw and explain the phase diagrams of water system, sulphur system

CO5: understand the concept of Electrochemistry and various terms related to it like resistance, conductance, specific resistance, cell constant, EMF, importance of Nernst Equation

CO6: determine the transference number of ions using Hittorf and moving boundary methods

CO7: understand the concept of reaction rates and determine the rate law from initial rate data, determine the order of reaction with respect to each reactant, the overall order of reaction, the rate constant with units

Bachelor of Science (Honours) Mathematics
(Semester-I)
Session: 2022-23
Course Title: Physical Chemistry
Course Code: BOMM-1085

Examination Time: 3 Hours

Max. Marks: 100

Theory: 60

Practical: 20

CA: 20

Instructions for the Paper Setters:

Eight questions of 12 marks each are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Unit I

Chemical Thermodynamics

Laws of thermodynamics, Enthalpy of a system, heat capacity, Isothermal and adiabatic process in ideal gases, Carnot cycle, thermodynamic efficiency, Thermo-Chemistry : heat of reaction at constant volume and pressure thermo chemical equations, calculations of E from H and vice versa, Hess's law of heat summation, heat of formation, heats of combustion, heat of solution, heat of neutralization of acids and bases, dependence of H and E for a reaction

(Kirchoff's equation). II and III law of thermodynamics: Entropy, dependence of entropy on variables of a system, Entropy change in ideal gases, entropy of mixing for ideal gases, entropy change in physical transformations, entropy change in chemical reactions, absolute Entropies, residual entropy, thermodynamics of III Law.

Unit II

Equilibrium

Equilibrium and Spontaneity under constraints- General conditions. Helmholtz free energy (A) for reactions. Gibbs free energy. Chemical potential, Gibbs free energy and entropy of mixing of ideal gases. The Equilibrium constants K_p and K_c of real gases. Phase Rule, Gibbs Phase rule, derivation of phase rule, one component system, the water system, the sulfur system.

Unit III

Chemical Kinetics

Measurement of reaction rate, order, molecularity of reaction, first order reactions, second order reactions, third order reactions, Methods of determination of order, effect of temperature, activation energy.

Unit IV

Electro-Chemistry

Conductance and Ionic Equilibrium: Faraday's law of electrolysis, Kohlrausch law of independent migration of ions, transference numbers, determination of transference numbers, electrolytic conductance, variation of conductance with concentration, equivalent conductance at infinite dilution, Applications of conductance measurements, Reversible and Irreversible cells, standard cells, cell

reaction and EMF. Single electrode potential and its calculation, thermodynamic and EMF, standard potential and equilibrium constants.

Books Recommended:

1. Physical Chemistry by Samuel H, Carl P. Putton; 4th Edition, Americ Inc. Co.
2. Physical Chemistry by Glasstone, 2nd Edition, The Macmillian Press Ltd.
3. Kinetic and Mechanism by Frost A and Pearson R.G, 3rd Edition, Wiley Eastern Pvt. Ltd.
4. Chemical Kinetic by K.J. Laidler, Harper and Row.
5. Physical Chemistry by Glberg W. Castellian Addison: 3rd Revised Edition Wesley publishing Comp

Bachelor of Science (Honours) Mathematics
(Semester-I)
Session: 2022-23
Course Title: Physical Chemistry Practical
Course Code: BOMM-1085 (P)

Course outcomes:

Students will be able to:

CO1: determine the surface tension of different liquids and solutions

CO2: determine the viscosity of different liquids and solutions

CO3: efficiently use of calorimeter in various experiments

CO4: determine heat of neutralization and heat of solution

Bachelor of Science (Honours) Mathematics
(Semester-I)
Session: 2022-25
Course Title: Physical Chemistry Practical
Course Code: BOMM-1085(P)

Examination Time: 3.5 Hours

Max. Marks: 20

Instruction for practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, KanyaMahaVidyalaya, Jalandhar.

1. Determine the coefficient of viscosity of the given liquid (CCl_4 , glycerine solution in water).
2. Determine the surface tension of given liquid (CCl_4 , glycerine solution in water) by drop number method.
3. Determine the surface tension of given liquid (CCl_4 , glycerine solution in water) by drop weight method.
4. Determine the water equivalent of given calorimeter.
5. Determine the enthalpy of neutralisation of a strong acid versus strong base.
6. Determine the enthalpy of neutralisation of a weak acid/weak base versus strong base/strong acid and determine the enthalpy of ionisation of the weak acid/weak base.
7. Determine the enthalpy of dissolution of solid calcium chloride in water at room temperature.

Books Recommended:

1. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.
2. Experiments in Physical Chemistry, R.C. Das and B. Behra, Tata McGraw Hill.
3. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
4. Advanced Experimental Chemistry, Vol. I, Physical, J.N. Guru and R. Kapoor, S. Chand and Co.
5. Selected Experiments in Physical Chemistry, N.G. Mukherjee, J.N. Ghosh and Sons.
6. Experiments Physical Chemistry, J.C. Ghosh, Bharati Bhavan.

Bachelor of Science (Honours) Mathematics

Semester-I

Session 2022-2023

Course Code: BOML-1175

Microeconomics

Course outcomes:

After passing this course students will be able to:

CO1: describe and apply the methods of analyzing consumer behavior through demand ,supply and elasticity.

CO2: have an in-depth understanding of consumer behavior.

CO3: analyze and demonstrate knowledge of the basic theories and laws in economics suchas laws of production.

CO4: learn about the various cost and revenue curves and production function.

Bachelor of Science (Honours) Mathematics
Semester-I
Session 2022-2025
Course Code: BOML-1175
Microeconomics

Time: 3 Hours

Max. Marks: 100

Theory: 80

CA:20

Note: Instructions for the Paper–Setter:

Two questions, each carrying 16 marks, from each of the Units I-IV (i.e. a total of eight questions) are to be set. Candidates are required to attempt five questions, selecting at least one from each unit. The fifth question may be attempted from any unit.

Unit I

Basic problems of an economy. Demand and Supply functions – an introductory view of price formation, Role of time element in price formation.

Price, income and cross elasticities of demand, Measurement of price elasticity of demand, Elasticity of substitution and the relationship between price elasticity, income elasticity and elasticity of substitution; Elasticity of supply.

Unit II

Theories of demand: The classical utility approach, Indifference curves approach, Revealed Preference approach, consumer's surplus.

Unit III

Theory of production: Production function, isoquants, returns to a factor and returns to scale and their compatibility, Elasticity of substitution, Economies of scale.

Unit IV

Cobb–Douglas production function, Production function of a multi-product firm.

Theories of Costs: Short and long period costs, Traditional and Modern theories of costs, Derivation of cost function from production function.

Revenue analysis: Revenue curves and their mutual relationship.

Recommended Books:

1. Ahuja, H. L. (2009), Modern Micro Economics, Sultan Chand and Co.
2. Koutsyannis, A. (1977), *Modern Microeconomics*, 2nd Edition, Macmillan Press, London.

Note: The latest edition of the books is recommended.

Course Outcomes

After passing this course, the students will be able to:

CO 1: Apply parallelogram law of forces, triangle law of forces, Lami's theorem to real life problems.

CO 2: Understand that how one can resolve number of coplanar forces, parallel forces and concurrent forces acting at a body.

CO 3: Understand the concept of equilibrium and its related properties.

CO 4: Find the applications of CG of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

Bachelor of Science (Honours) Mathematics
Semester-I
Session 2022 -23
Course Title: Statics
Course Code: BOML-1336

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

Unit- I

Composition and resolution of forces (parallelogram law, triangle law, polygon law, Lami's Theorem, $(\lambda-\mu)$ theorem). Resultant of a number of coplanar forces.

Unit- II

Parallel forces, Moments, Varignon's theorem of moments, Couples, Resultant of two Coplanar Couples, Equilibrium of two coplanar couples, Resultant of a force and a couple.

Unit -III

Equilibrium of a rigid body acted on by three forces in a plane, General Conditions of equilibrium of a rigid body acted on by forces in one plane.

Unit -IV

Friction, Laws of friction, Equilibrium of a particle on a rough plane. Centre of Gravity: Centre of gravity of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

Text Book:

S.L. Loney, The Elements of Statics and Dynamics, Arihant Publications, Sixth edition, 2016

Course Outcomes: Mechanics -Paper (A)

After passing this course, students will be able to:

CO1: Understand the various coordinate systems and its applications. Students will be able to know the conservations laws and the symmetries of space & time.

CO2: Know the fundamental forces of nature, concept of centre of mass, central forces and the motion of particle under central force and to determine the turning points of orbit.

CO3: Understand the frames of reference, coriolis forces and its applications and effect of rotation of earth on g.

CO4: understand the elastic collision in different systems, cross section of elastic scattering as well as Rutherford scattering and know the motion of rigid body.

Bachelor of Science (Hons.) Mathematics Semester–I

(Session 2022-23)

Course Name: Mechanics

Course Code: BOMM-1396

Examination Time: 3 Hours

Total Teaching hours: 60

Passing marks: 35%

Max. Marks: 100

Theory:60 (External) CA:20

Instructions for Paper setter:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question carries 12 marks.

Unit- I

Inertial Cartesian and spherical polar co-ordinate systems: area, volume, displacement, velocity and acceleration in these systems, solid angles and frames of reference, Galilean transformation, Galilean Invariance of space & time intervals; fictitious forces. Effect of rotation of earth on 'g'. Effects of centrifugal and Coriolis forces produced as a result of earth's rotation.

Unit- II

Internal forces and momentum conservation. Centre of mass. Elastic collisions in laboratory and center of mass systems; velocities, angles, energies in these systems and their relationships. Conservation of angular momentum and examples -shape of the galaxy, angular momentum of solar system. Torques due to internal forces, angular momentum about centre of mass. Cross-section of elastic scattering and impact parameter, Rutherford scattering.

Unit- III

Forces in nature (qualitative). Central forces, Potential energy and force between a point mass and spherical shell, a point mass and solid sphere, gravitational and electrostatic self energy. Two body problem and concept of reduced mass. Motion of a body under central force; differential equation of the orbit, equation of orbit in inverse-square force field. Kepler's laws and their derivation.

Equation of motion of a rigid body, Rotational motion of a rigid body in general and that of plane lamina. Rotation of angular momentum vector about a fixed axis. Angular momentum and kinetic energy of a rigid body about principal axis, Euler's equations.

Suggested Readings:

1. Mechanics-Berkeley Physics Course, Vol-I (second edition):C. Kittel, W. D. Knight, M. A. Ruderman, C. A. Helmholtz and R. J. Moyer-Tata Mc Graw Hill Publishing Company Ltd., New Delhi.
2. Fundamentals of Physics: D. Halliday, R. Resnick and J. Walker (sixth edition)-Wiley India Pvt. Ltd., New Delhi, 2004.
3. Analytical Mechanics: S. K. Gupta, Modern Publishers.
4. An Introduction to Mechanics. Daniel Kleppner & Robert Kolenkow Tata Mc Graw Hill Publishing Company Ltd., New Delhi

**SEMESTER–I
PHYSICS
PHYSICS PRACTICAL
Course code: BOMM-1396 (P)**

Instructions to Practical Examiner

Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar

General Guidelines for Practical Examination

I. The distribution of marks is as follows: **Marks: 20**

i) One experiment **7 Marks**

ii) Brief Theory **3 Marks**

iii) Viva–Voce **5 Marks**

iv) Record (Practical file) **5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment is to be allotted to more than three examinees in any group.

LIST OF EXPERIMENTS

1. To study the dependence of moment of inertia on distribution of mass (by noting time periods of oscillations using objects of various geometrical shapes but of same mass).
2. To establish relationship between torque and angular acceleration using fly wheel.
3. To find the moment of inertia of a flywheel.
4. Study of bending of beams and determination of Young's modulus.
5. Determination of Poisson's ratio for rubber.
6. To determine energy transfer, coefficient of restitution and verify laws of conservation of linear momentum and kinetic energy in elastic collisions using one dimensional collisions of hanging spheres.
7. Measure time period as a function of distance of centre of suspension (oscillation) from centre of mass, plot relevant graphs, determine radius of gyration and acceleration due to gravity.
8. Find the value of 'g' by Kater's pendulum.
9. Measure time period of oscillation of a Maxwell needle and determine modulus of rigidity of the material of a given wire.
10. To measure logarithmic decrement, coefficient of damping, relaxation time, and quality factor of a damped simple pendulum.

FOUNDATION COURSE

Course Title: Foundation Course

Course Duration: 30 hours

Course intended for: Semester I students of undergraduate degree programmes of all streams.

Course Credits: 1

Course Code: SECF-I

PURPOSE & AIM

This course has been designed to strengthen the intellectual foundation of all the new entrants in the college. One of the most common factors found in the students seeking admission in college after high school is the lack of an overall view of human history, knowledge of global issues, peaks of human intellect, social/political benchmarks and inventors & discoverers who have impacted human life. For a student, the process of transformation from school to college is full of apprehension and intimidation of the system. The Foundation Programme intends to bridge the gap between high school and college education and develop an intellectual readiness and base for acquiring higher education.

INSTRUCTIONAL OBJECTIVES

- to enable the students to realise their position in the whole saga of time and space
- to inculcate in them an appreciation of life, cultures and people across the globe
- to promote, in the students, an awareness of human intellectual history
- to make them responsible and humane world citizens so that they can carry forward the rich legacy of humanity

CURRICULUM

MODULE	TITLE	CONTACT HOURS
I	Introduction & Initial Assessment	2
II	The Human Story	3
III	<i>The Vedas</i> and the Indian Philosophy	2.5
IV	Woman: A Journey through the Ages	2.5
V	Changing Paradigms in Society, Religion & Literature	2.5
VI	Makers of Modern India	2.5
VII	Racism: Story of the West	2.5
VIII	Modern World at a Glance: Political & Economic Perspective	2.5

IX	Technology Vis a Vis Human Life	2.5
X	My Nation My Pride	2.5
XI	The KMV Experience	2.5
XII	Final Assessment, Feedback & Closure	2.5

EXAMINATION

- **Total Marks: 25 (Final Exam: 20; Internal Assessment: 5)**
- Final Exam: multiple choice quiz. Marks – 20; Time: 1 hour
- Internal Assessment: 5 (Assessment: 3; Attendance:2)
Comparative assessment questions (medium length) in the beginning and close of the programme.
Marks: 3; Time: 0.5 hour each at the beginning and end.
- Total marks: 25 converted to grade for final result
- Grading system: 90% marks & above: A grade
80% - 89% marks : B grade
70% - 79% marks : C grade
60% - 69% marks : D grade
50% - 59% marks : E grade
Below 50% marks : F grade (Fail - must give the exam again)

SYLLABUS

Module I Being a Human: Introduction & Initial Assessment

- Introduction to the programme
- Initial Assessment of the students through written answers to a couple of questions

Module 2 The Human Story

- Comprehensive overview of human intellectual growth right from the birth of human history
- The wisdom of the Ancients
- Dark Middle Ages
- Revolutionary Renaissance
- Progressive modern times
- Most momentous turning points, inventions and discoveries

Module 3 *The Vedas* and the Indian Philosophy

- Origin, teachings and significance of *The Vedas*
- Upnishads and Puranas
- Karma Theory of *The Bhagwad Gita*
- Main tenets of Buddhism & Jainism
- Teachings of Guru Granth Sahib

Module 4 Changing Paradigms in Society, Religion & Literature

- Renaissance: The Age of Rebirth
- Transformation in human thought
- Importance of humanism
- Geocentricism to heliocentricism
- Copernicus, Galileo, Columbus, Darwin and Saint Joan
- Empathy and Compassion

Module 5 Woman: A Journey through the Ages

- Status of women in pre-vedic times
- Women in ancient Greek and Roman civilizations
- Women in vedic and ancient India
- Status of women in the Muslim world
- Women in the modern world
- Crimes against women
- Women labour workforce participation
- Women in politics
- Status of women- our dream

Module 6 Makers of Modern India

- Early engagement of foreigners with India
- Education: The first step to modernization
- Railways: The lifeline of India
- Raja Ram Mohan Roy, Gandhi, Nehru, Vivekanand, Sardar Patel etc.
- Indira Gandhi, Mother Teresa, Homai Vyarawala etc.
- The Way Ahead

Module 7 Racism: Story of the West

- European beginnings of racism
- Racism in the USA - Jim Crow Laws
- Martin Luther King Jr. and the battle against racism
- Apartheid and Nelson Mandela
- Changing face of racism in the modern world

Module 8 Modern World at a Glance: Political & Economic Perspective

- Changing world order
- World War I & II
- UNO and The Commonwealth
- Nuclear Powers; Terrorism
- Economic Scenario: IMF, World Bank
- International Regional Economic Integration

Module 9 Technology Vis a Vis Human Life

- Impact of technology on modern life
- Technological gadgets and their role in our lives
- Technology and environment
- Consumerism and materialism
- Psychological and emotional consequences of technology
- Harmonizing technology with ethics and humaneness

Module 10 My Nation My Pride

- Indian Past Culture and Heritage
- Major Discoveries (Medicinal and Scientific)
- Vedic Age
- Prominent Achievements
- Art, Architecture and Literature

Module 11 The KMV Experience

- Historical Legacy of KMV
- Pioneering role in women emancipation and empowerment
- KMV Contribution in the Indian Freedom Struggle
- Moral, cultural and intellectual heritage of KMV
- Landmark achievements
- Innovative initiatives; international endeavours
- Vision, mission and focus
- Conduct guidelines for students

Module 12 Final Assessment, Feedback & Closure

- Final multiple choice quiz
- Assessment through the same questions asked in the beginning
- Feedback about the programme from the students
- Closure of the programme

PRESCRIBED READING

- *The Human Story* published by Dawn Publications

Scheme and Curriculum of Examinations of Three-Year Degree Programme
Bachelor of Science (Honours) Mathematics Semester-II
Session-2022-23

Bachelor of Science (Honours) Mathematics Semester-II							
Course Code	Course type	Course Title	Max.Marks				Examination time in hours
			Total	Ext.		CA	
				L	P		
BOML-2421/ BOML-2031/ BOML-2431	C	Punjabi (Compulsory)/ ¹ Basic Punjabi/ ² Punjab History and Culture	50	40	-	10	3
BOMM-2102	C	Communication skills in English	50	23	15	10	3
BOML-2333	C	Calculus-II	100	80	-	20	3
BOML-2334	C	Matrices and Theory of Equations	100	80	-	20	3
BOML-2335	C	Solid Geometry	100	80	-	20	3
BOML-2336	C	³ Dynamics	100	80	-	20	3
OR		OR					
BOMM-2396	C	⁴ Modern Physics	100	60	20	20	3+3
BOMM-2137	C	Computer Fundamentals and Introduction to C Programming Language	100	50	30	20	3+3
AECD-2161	AC	*Drug Abuse : Problem, Management and Prevention (Compulsory)	50	40	-	10	3
SECM-2302	AC	*Moral Education	25	20	-	5	1
		Total Marks	600				

Note:

¹ Special Course in lieu of Punjabi (Compulsory)

² Special Course in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.

³ Only those students can opt these courses who have not studied Chemistry at +2 level.

⁴ Only those students can opt these courses who have studied Chemistry at +2 level.

* Marks of these papers will not be added in total marks. Grades will be provided.

C-Compulsory

AC-Audit Course

**BACHELOR OF SCIENCE (HONOURS) MATHEMATICS/ BACHELOR OF ARTS (HONOURS)
ENGLISH/ BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER-II**

COURSE CODE- BOEL/BOML/BOPL-2421

COURSE OUTCOMES

CO1: 'ਸਾਹਿਤ ਦੇ ਰੰਗ' ਪੁਸਤਕ ਦੇ ਵਾਰਤਕ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਵਾਰਤਕ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ।

CO2: ਇਸ ਦਾ ਹੋਰ ਮਨੋਰਥ ਭਾਸ਼ਣ ਕਲਾ ਤੇ ਲਿਖਣ ਕਲਾ ਦੀ ਨਿਪੁੰਨਤਾ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO3: 'ਸਾਹਿਤ ਦੇ ਰੰਗ' ਪੁਸਤਕ ਦੇ ਰੇਖਾ ਚਿੱਤਰ ਭਾਗ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਰੇਖਾ ਚਿੱਤਰ ਨੂੰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤੇ ਇਹਨਾਂ ਮਹਾਨ ਸ਼ਖ਼ਸੀਅਤਾਂ ਦੀ ਸਫਲਤਾ ਪਿੱਛੇ ਘਾਲੀਆਂ ਘਾਲਣਾਵਾਂ ਤੇ ਵਾਕਫ਼ ਕਰਵਾਉਂਦਿਆਂ ਜੀਵਨ ਸੇਧ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ।

CO4: ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO6: ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

CO7: ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ। ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

Punjabi (Compulsory)

BACHELOR OF SCIENCE (HONOURS) MATHEMATICS/ BACHELOR OF ARTS (HONOURS)
 ENGLISH/ BACHELOR OF SCIENCE (HONOURS) PHYSICS
 SEMESTER-II

COURSE CODE- BOEL/BOML/BOPL-2421

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50

Theory : 40

CA :10

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾ ਮਹਿਲਸਿੰਘ), ਭਾਗ ਦੂਜਾ (ਵਾਰਤਕ), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
 (ਲਾਲ ਬਾਦਸ਼ਾਹ, ਹਾਰ ਸ਼ਿੰਗਾਰ, ਡੂੰਘੀਆਂ ਸਿਖਰਾਂ ਲੇਖ ਪਾਠ ਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹਨ)
 (ਸਾਰ, ਵਿਸ਼ਾ ਵਸਤੂ)

08 ਅੰਕ

ਯੂਨਿਟ-II

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾ ਮਹਿਲ ਸਿੰਘ), ਭਾਗ ਦੂਜਾ (ਰੇਖਾਚਿੱਤਰ), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
 (ਬਾਤਾਂ ਮੋਹਨ ਸਿੰਘ ਕੀਆਂ, ਗੁਲਾਬੀ ਕਾਗਜ਼ ਉਤੇ ਲਿਖੀ ਕਵੀਤਾ: ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ, ਸਤਿੰਦਰ ਸਿੰਘ ਨੂਰ : ਸਾਹਿਤ ਦਾ
 ਜਥੇਦਾਰ ਰੇਖਾ ਚਿੱਤਰ ਪਾਠ ਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹਨ)
 (ਸਾਰ, ਵਿਸ਼ਾ ਵਸਤੂ)

08 ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਮੁਹਾਵਰੇ
 (ਅ) ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪਸ਼ੁਨਾਂ ਦੇ ਉਤਰ।

08 ਅੰਕ

ਯੂਨਿਟ-IV

(ੳ) ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ
 (ਅ) ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ: ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸੰਬੰਧਕ, ਯੋਜਕ, ਵਿਸਮਿਕ

08 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION/BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION) / BACHELOR OF SCIENCE (FASHION DESIGNING) / BACHELOR OF SCIENCE. (HOME SCIENCE) / BACHELOR OF COMPUTER APPLICATIONS/BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)/ BACHELOR OF SCIENCE (BIO-TECHNOLOGY)/BACHELOR OF SCIENCE (HONOURS)MATHEMATICS/ BACHELOR OF ARTS (HONOURS) ENGLISH/BACHELOR OF COMMERCE (HONOURS) BACHELOR OF SCIENCE (HONOURS) PHYSICSSEMESTER-II

BASIC PUNJABI

In lieu of Punjabi (Compulsory)

**COURSE CODE -BARL/BSML/BSNL/BCSL/BECL/BCRL/BBRL/BJML/BFDL/
BHSL/BCAL/BITL/BBTL/BOML/BOEL/BCOL/BOPL-2031**

Course outcomes

CO1:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਿਖਾਉਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਪਾ ਕੇ ਇਕ ਹੋਰ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੇ ਮੌਕੇ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ।

CO2:ਇਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਬਾਰੀਕਬੀਨੀ ਨਾਲ ਭਾਸ਼ਾ ਦਾ ਅਧਿਐਨ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO3:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO4:ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

CO5:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦਾ ਸ਼ਬਦ ਘੇਰਾ ਵਿਸ਼ਾਲ ਕਰਨਾ ਹੈ।

CO6:ਵਿਦਿਆਰਥੀ ਵਾਕ ਦੀ ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਇਸਦੀ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ ਅਤੇ ਭਾਸ਼ਾ ਤੇ ਪਕੜ ਮਜ਼ਬੂਤ ਹੋਵੇਗੀ।

CO7:ਪੈਰ੍ਹਾ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO8: ਘਰੇਲੂ ਅਤੇ ਦਫਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਲਿਖਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨ ਕਰਨਾ ਹੈ।

CO9:ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ। ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

SESSION 2022-23

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION/BACHELOR OF ARTS (JOURNALISM & MASS COMMUNICATION) / BACHELOR OF SCIENCE (FASHION DESIGNING) / BACHELOR OF SCIENCE. (HOME SCIENCE) / BACHELOR OF COMPUTER APPLICATIONS/BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)/ BACHELOR OF SCIENCE (BIO-TECHNOLOGY)/ BACHELOR OF SCIENCE (HONOURS)MATHEMATICS/ BACHELOR OF ARTS (HONOURS) ENGLISH/BACHELOR OF COMMERCE (HONOURS) BACHELOR OF SCIENCE (HONOURS) PHYSICS SEMESTER-II

BASIC PUNJABI

In lieu of Punjabi(Compulsory)

COURSE CODE -BARL/BSML/BSNL/BCSL/BECL/BCRL/BBRL/BJML/BFDL/
BHSL/BCAL/BITL/BBTL/BOML/BOEL/BCOL/BOPL-2031

smW: 3 GMty

Maximum

Marks: 50

Theory : 40

CA : 10

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ (ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸਬੰਧਕ, ਯੋਜਕ ਅਤੇ ਵਿਸਮਿਕ)

08 ਅੰਕ

ਯੂਨਿਟ-II

ਪੰਜਾਬੀਵਾਕਬਣਤਰ : ਮੁੱਢਲੀਜਾਣਪਛਾਣ

(ੳ) ਸਾਧਾਰਨਵਾਕ, ਸੰਯੁਕਤ ਵਾਕ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

(ਅ) ਬਿਆਨੀਆ ਵਾਕ, ਪ੍ਰਸ਼ਨ ਵਾਚਕ ਵਾਕ ਅਤੇ ਹੁਕਮੀ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

08 ਅੰਕ

ਯੂਨਿਟ-III

ਪੈਰ੍ਹਾ ਰਚਨਾ

ਅਖਾਣ (ਅਖਾਣਾਂ ਦੀ ਲਿਸਟ ਨਾਲ ਨੱਥੀ ਹੈ)

08 ਅੰਕ

ਯੂਨਿਟ-IV

ਚਿੱਠੀ ਪੱਤਰ (ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ)

ਮੁਹਾਵਰੇ (ਮੁਹਾਵਰਿਆਂ ਦੀ ਲਿਸਟ ਨਾਲ ਨੱਥੀ ਹੈ)

08 ਅੰਕ

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

ਉਦਮ ਅੱਗੇ ਲੱਛਮੀ ਪੱਖੇ ਅੱਗੇ ਪੈਣ ,ਉਹ ਦਿਨ ਡੁੱਬਾ ਜਦੋਂ ਘੋੜੀ ਚੜ੍ਹਿਆ ਕੁੱਬਾ ,ਉੱਚੀ ਦੁਕਾਨ ਫਿੱਕਾ ਪਕਵਾਨ ,ਉਲਟੀ ਵਾੜ ਖੇਤ ਨੂੰ
 ਖਾਏ ,ਉੱਚਾ ਲੰਮਾ ਗੱਭਰੂ ਪੱਲੇ ਠੀਕਰੀਆਂ ,ਅੱਖੀਂ ਵੇਖ ਕੇ ਮੱਖੀ ਨਹੀਂ ਨਿਗਲੀ ਜਾਂਦੀ ,ਅੰਦਰ ਹੋਵੇ ਸੱਚ ਤਾਂ ਕੋਠੇ ਚੜ੍ਹ ਕੇ ਨੱਚ ,ਆਪੇ ਮੈਂ
 ਰੱਜੀ ਪੁੱਜੀ ਆਪੇ ਮੇਰੇ ਬੱਚੇ ਜਿਉਣ ,ਆਪ ਕੁਚੱਜੀ ਵਿਹੜੇ ਨੂੰ ਦੇਸ਼ ,ਅੰਨ੍ਹਾ ਵੰਡੇ ਰਿਉੜੀਆਂ ਮੁੜ ਮੁੜ ਆਪਣਿਆਂ ਨੂੰ ,ਅਕਲ ਵੱਡੀ ਕੇ
 ਮੱਝ ,ਅੰਨ੍ਹਿਆਂ ਵਿੱਚ ਕਾਣਾ ਰਾਜਾ ,ਆਪਣੀ ਪੀੜ੍ਹੀ ਹੇਠ ਸੋਟਾ ਫੇਰਨਾ ,ਇਕ ਅਨਾਰ ਸੌ ਬਿਮਾਰ ,ਇਕ ਹੱਥ ਨਾਲ ਤਾੜੀ ਨਹੀਂ
 ਵੱਜਦੀ ,ਇੱਕ ਚੁੱਪ ਸੌ ਸੁੱਖ ਝੱਟ ਮੰਗਣੀ ਪੱਟ ਵਿਆਹ ,ਸਹਿਜ ਪੱਕੇ ਸੇ ਮੀਠਾ ਹੋਵੇ ਦਾਲ ਵਿੱਚ ਕਾਲਾ ਹੋਣਾ ਦਾਲ ਵਿੱਚ ਕਾਲਾ ਹੋਣਾ ,ਸੱਦੀ
 ਨਾ ਬੁਲਾਈ ਮੈਂ ਲਾੜੇ ਦੀ ਤਾਈਂ ,ਸਵੈ ਭਰੋਸਾ ਵੱਡਾ ਤੇਸਾ ,ਸੌ ਦਿਨ ਚੋਰ ਦੇ ਇਕ ਦਿਨ ਸਾਧ ਦਾ ,ਸੱਪ ਦਾ ਬੱਚਾ ਸਪੇਲੀਆ ,ਸੱਪ ਮਰ ਜਾਵੇ
 ਲਾਠੀ ਵੀ ਨਾ ਟੁੱਟੇ ,ਸਾਈਆਂ ਕਿਤੇ ਵਧਾਈਆਂ ਕਿਤੇ ,ਹੰਕਾਰਿਆ ਸੇ ਮਾਰਿਆ ,ਹਾਥੀ ਲੰਘ ਗਿਆ ਪੂਛ ਰਹਿ ਗਈ ,ਕੁੱਛੜ ਕੁੜੀ ਸਹਿਰ
 ਢੰਡੇਰਾ ,ਕੋਲਿਆਂ ਦੀ ਦਲਾਲੀ ਵਿੱਚ ਮੂੰਹ ਕਾਲਾ ,ਕਰੇ ਕੋਈ ਭਰੇ ਕੋਈ ,ਕਰ ਮਜ਼੍ਹੂਰੀ ਤੇ ਖਾਹ ਚੂਰੀ ,ਖਵਾਜੇ ਦਾ ਗਵਾਹ ਡੱਡੂ ,ਖੇਤੀ
 ਖਸਮਾਂ ਸੇਤੀ ,ਖੂਹ ਪੁੱਟਦੇ ਨੂੰ ਖਾਤਾ ਤਿਆਰ ,ਘਰ ਦਾ ਭੇਤੀ ਲੰਕਾ ਢਾਹੇ ,ਘਰ ਦੀ ਕੁੱਕੜੀ ਦਾਲ ਬਰਾਬਰ ,ਚਿੰਤਾ ਚਿਖਾ ਬਰਾਬਰ ,ਛੱਜ
 ਤਾਂ ਬੋਲੇ ਛਾਣਨੀ ਵੀ ਬੋਲੇ,ਛੋਟੀ ਮੂੰਹ ਵੱਡੀ ਗੱਲ ,ਜਾਂਦੇ ਚੋਰ ਦੀ ਲੰਗੋਟੀ ਹੀ ਸਹੀ ,ਜਿਸ ਦੀ ਕੋਠੀ ਦਾਣੇ ਉਹਦੇ ਕਮਲੇ ਵੀ ਸਿਆਣੇ ,ਜਿਹੜੇ
 ਗੱਜਦੇ ਨੇ ਉਹ ਵਰ੍ਹਦੇ ਨਹੀਂ ,ਜਾਤ ਦੀ ਕੋਹੜ ਕਿਰਲੀ ਸਤੀਰਾਂ ਨੂੰ ਜੱਫੇ ,ਝੱਟ ਮੰਗਣੀ ਪੱਟ ਵਿਆਹ ,ਦਾਲ ਵਿੱਚ ਕਾਲਾ ਹੋਣਾ ,ਦਾਣੇ ਦਾਣੇ ਤੇ
 ਮੇਰ ,ਨਾਲੇ ਚੋਰ ਨਾਲੇ ਚਤਰ ,ਪੇਟ ਨਾ ਪਈਆਂ ਰੋਟੀਆਂ ਸਭੇ ਗੱਲਾਂ ਖੇਟੀਆਂ ,ਬਿਨਾਂ ਰੋਇਆਂ ਮਾਂ ਵੀ ਦੁੱਧ ਨਹੀਂ ਦਿੰਦੀ ,ਬੁੱਢੀ ਘੋੜੀ ਲਾਲ
 ਲਗਾਮ ,ਭੱਜਦਿਆਂ ਨੂੰ ਵਾਹਣ ਇੱਕੇ ਜਿਹੇ ,ਭੱਜੀਆਂ ਬਾਹਾਂ ਗਲ ਨੂੰ ਆਉਂਦੀਆਂ ਨੇ ,ਰਾਹ ਪਿਆ ਜਾਣੀਏਂ ਜਾਂ ਵਾਹ ਪਿਆ ਜਾਣੀਏ ,ਰਾਈ ਦਾ
 ਪਹਾੜ ਬਣਾਉਣਾ ,ਰੱਸੀ ਸੜ ਗਈ ਵੱਟ ਨੂੰ ਗਿਆ

Bachelor of Arts/ Bachelor of Science (Medical) / Bachelor of Science (Non Medical) / Bachelor of Science(Honours) Maths/ Bachelor of Science (Honours) Physics/Bachelor of Science (Computer Science) / Bachelor of Science (Economics) / Bachelor of Commerce / Bachelor of Business Administration/ Bachelor of Arts (Journalism & Mass Communication) / Bachelor of .Science (Fashion Design) / Bachelor of Science (Home Science) / /Bachelor of Computer Application /Bachelor of Science(Information Technology)/ Bachelor of Science (Bio Technology) / Bachelor of Arts (Honours.)English

(Semester-II)

Session 2022-23

Course Title: Punjab History and Culture (C. 320 to 1000 B.C.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

Course Code: BARL-2431/ BSML-2431/ BSNL-2431/ BOML-2431/ BOPL-2431/ BCSL-2431/

BECL-2431/ BCRL-2431/ BBRL-2431/ BJML-2431/ BFDL-2431/ BHSL-2431/ BCAL-2431/

BITL-2431 / BBTL-2431/BOEL-2431

COURSE OUTCOMES

After completing Semester II and course on Ancient History of Punjab, students of History will be able to identify and have a complete grasp on the sources & writings of Ancient History of Punjab

CO 1: Analyse the emergence of Mauryan, Gupta empires during the classical age in India

CO 2: To understand the various factors leading to rise and fall of empires and emergence of new dynasties and their Culture, society, administration , polity and religion specifically of Kushans and Vardhanas in the Punjab

CO 3: Students will be adept in constructing original historical argument based on primary source material research

CO 4: To have an insight on the existing Literature of this period and understand the past developments in the light of present scenario.

CO 5: To enable students to have thorough insight into the various forms/styles of Architecture and synthesis of Indo - Muslim Art and Architecture in Punjab

Bachelor of Arts/ Bachelor of Science (Medical) / Bachelor of Science (Non-SMedical) / Bachelor of Science(Honours) Maths/ Bachelor of Science (Honours) Physics/Bachelor of Science (Computer Science) / Bachelor of Science (Economics) / Bachelor of Commerce / Bachelor of Business Administration/ Bachelor of Arts (Journalism & Mass Communication) / Bachelor of .Science (Fashion Design) / Bachelor of Science (Home Science) / /Bachelor of Computer Application /Bachelor of Science(Information Technology)/ Bachelor of Science (Bio Technology) / Bachelor of Arts (Honours.) English

(Semester-II)

Session 2022-23

Course Title: Punjab History and Culture (C. 320 to 1000 B.C.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

Course Code: BARL-2431/ BSML-2431/ BSNL-2431/ BOML-2431/ BOPL-2431/ BCSL-2431/ BECL-2431/ BCRL-2431/ BBRL-2431/ BJML-2431/ BFDL-2431/ BHSL-2431/ BCAL-2431/ BITL-2431 / BBTL-2431/BOEL-2431

Examination Time: 3 Hours

Marks: 50

Max.

Theory: 40

CA: 10

Instructions for the Paper Setter:

- 1.Question paper shall consist of four Units**
- 2.Examiner shall set 8 questions in all by selecting Two Questions of equal marks from each Unit.**
- 3.Candidates shall attempt 5 questions in 600 words, by at least selecting One Question from each Unit and the 5th question may be attempted from any of the four Units.**
- 4.Each question will carry 8 marks**

Unit-I

1. Alexander's Invasion's and Impact
2. Administration of Chandragupta Maurya and Ashoka.

Unit-II

3. The Kushans: Gandhar School of Art .
4. Gupta Empire: Golden period (Science , Art and Literature)

Unit-III

5. The Punjab under the Harshvardhana
6. Socio-cultural History of Punjab from 7th to 1000 A.D.

UNIT IV

7. Development of Languages and Education with Special reference to Taxila
8. Development to Art and Architecture

Suggested Readings

1. L. M Joshi (ed), *History and Culture of the Punjab*, Art-I, Punjabi University, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed.), *History of Punjab* , Vol.I, Punjabi University, Patiala, 1977.
3. Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
4. B.N. Sharma: *Life in Northern India*, Delhi. 1966.

BACHELOR OF VOCATION (RETAIL MANAGEMENT) / BACHELOR OF VOCATION (MANAGEMENT & SECRETARIAL PRACTICES)/ BACHELOR OF VOCATION (ANIMATION)/ BACHELOR OF VOCATION (TEXTILE DESIGN & APPAREL TECHNOLOGY)/ BACHELOR OF VOCATION (NUTRITION EXERCISE & HEALTH)/ BACHELOR OF VOCATION (BEAUTY AND WELLNESS)/BACHELOR OF VOCATION (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)/ BACHELOR OF VOCATION (HOSPITALITY AND TOURISM) / DIPLOMA IN GERIATRIC CARE(OLD AGE CARE AND NUTRITION) (Semester II)

Session 2022-23

COMMUNICATION SKILLS IN ENGLISH

Course Code: BJMM/BFDM/BHSM/BCAM/BITM/

**BBTM /BOMM/BOPM/ DGCM/BVRM/BVMM/BVAM/BVTM/BVNM/BVBM /
BVAI/BVHM-2102**

COURSE OUTCOMES

At the end of this course, the students will develop the following skills:

CO 1: Enhancement of listening skills with the help of listening exercises based on conversation, news and TV reports

CO 2: The ability of Note-Taking to be able to distinguish the main points from the supporting details and the irrelevant information from the relevant one using Listening Skills

CO 3: Acquisition of knowledge of phonetics which will help them in learning about correct pronunciation as well as effective speaking

CO 4: Speaking skills of the students enabling them to take active part in group discussion and present their own ideas

BACHELOR OF VOCATION (RETAIL MANAGEMENT) / BACHELOR OF VOCATION (MANAGEMENT & SECRETARIAL PRACTICES)/ BACHELOR OF VOCATION (ANIMATION)/ BACHELOR OF VOCATION (TEXTILE DESIGN & APPAREL TECHNOLOGY)/ BACHELOR OF VOCATION (NUTRITION EXERCISE & HEALTH)/ BACHELOR OF VOCATION (BEAUTY AND WELLNESS)/BACHELOR OF VOCATION (ARTIFICIAL INTELLIGENCE AND DATA SCIENCE)/ BACHELOR OF VOCATION (HOSPITALITY AND TOURISM) / DIPLOMA IN GERIATRIC CARE(OLD AGE CARE AND NUTRITION) (Semester II)

Session 2022-23

COMMUNICATION SKILLS IN ENGLISH

Course Code: BJMM/BFDM/BHSM/BCAM/BITM/

**BBTM /BOMM/BOPM/ DGCM/BVRM/BVMM/BVAM/BVTM/BVNM/BVBM /
BVAI/BVHM-2102**

Time: 3 hours (Theory)

Max. Marks: 50

3 hours (Practical)

Theory: 25

Practical: 15

Continuous Assessment: 10

Instructions for the paper setters and distribution of marks:

The question paper will consist of four sections and distribution of marks will be as under:

Section-A: Two questions of theoretical nature will be set from Unit I of the syllabus and the candidates will have to attempt one carrying 5 marks.

Section-B: Two questions will be set from Unit II of the syllabus. Candidates will have to attempt one carrying 5 marks.

Section-C: Two questions will be set from Unit III of the syllabus. Candidates will have to attempt one carrying 5 marks.

Section-D: Two questions will be set from Unit IV of the syllabus. Candidates will have to attempt one carrying 5 marks.

Important Note:

The candidate will have to attempt five questions in all selecting one from each section of the question paper and the fifth question from any of the four sections.

(5 x 5 = 25)

Course Contents:**Unit I**

Listening Skills: Barriers to listening; effective listening skills; feedback skills.

Activities: Listening exercises – Listening to conversation, News and TV reports

Unit II

Attending telephone calls; note taking and note making

Activities: Taking notes on a speech/lecture

Unit III

Speaking and Conversational Skills: Components of a meaningful and easy conversation, understanding the cue and making appropriate responses, forms of polite speech, asking and providing information on general topics

Activities: 1) Making conversation and taking turns

2) Oral description or explanation of a common object, situation or concept

Unit IV

The study of sounds of English, stress Situation based

Activities: Giving Interviews

Recommended Books:

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
2. *Business Communication* by Sethi, A and Adhikari, B., McGraw Hill Education 2009.
3. *Communication Skills* by Raman, M. & S. Sharma, OUP, New Delhi, India (2011).
4. *A Course in Phonetics and Spoken English* by J. Sethi and P.V. Dhamija, Phi Learning.

Time: 3 hours

Marks: 15

Course Contents:

1. Oral Presentation with/without audio visual aids
2. Group Discussion
3. Listening to any recorded or live material and asking oral questions for listening comprehension

Questions:

1. Oral Presentation will be of 5 to 7 minutes duration. (Topic can be given in advance or it can be of student's own choice). Use of audio-visual aids is desirable.
2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

Bachelor of Science (Honours) Mathematics Semester-II
Session-2022-23
Course Title: Calculus-II
Course Code: BOML-2333

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate an understanding of sequences and series and their convergence, Cauchy criterion, sub sequence and algebra of limit of sequences.

CO 2: Know and describe the behaviour of Infinite series using various tests like comparison test, Cauchy Integral test. Ratio test, Raabe's test, logarithmic test and Gauss test etc.

CO 3: Distinguish between the absolute convergence and conditional convergence.

CO 4: Manage to solve the problem related to Fourier series expansion, Fourier series for even and odd functions and half range series.

Bachelor of Science (Honours) Mathematics Semester–II

Session: 2022-23

Course Title: Calculus-II

Course Code: BOML-2333

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setter: Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Sequence, sub sequence, bounded sequences, monotone sequences, convergence, Cauchy criterion, algebra of limit of sequences (proofs with ε -N rigor), Sandwich Theorem

Unit-II

Infinite series, Sequences of partial sums, convergence of series, series of non-negative terms, comparison tests, Cauchys' Integral test. Ratio test, Raabe's test, logarithmic test and Gauss test (all tests with proofs).

Unit-III

Alternating series, absolute and conditional convergence, Leibnitz Theorem, Convergence of Power Series, Taylor Series, Error estimates

Unit-IV

Periodic functions, trigonometric series, Fourier series expansion, Fourier series for even and odd functions, half range series.

Text Book:

George B. Thomas and Ross L. Finney, Calculus and Analytic Geometry, Pearson publication, 9th Edition, 1998.

Reference Books:

1. S. C. Malik and S. Arora, Mathematical Analysis, New Age International Publishers, New Delhi, 2nd Edition, 2005.
2. Sudhir R. Ghorpade and B.V. Limaye, A course in calculus and real analysis, Springer, 2006.
3. E. Kreyszig, Advanced Engineering Mathematics, Wiley Publication, 10th Edition, 2011.

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of matrix congruence of skew symmetric matrices and its reduction in real field.

CO 2: Explain how all polynomials can be broken down by using Fundamental Theorem of Algebra to provide structure for abstraction into fields like Modern Algebra. Also able to solve system of linear equations and obtain Eigen values, Eigen vectors, minimal and characteristic equation of a matrix and to apply it in advanced dynamics and electric current.

CO 3: To find the relations between the roots and coefficients of general polynomial equation in one variable.

CO 4: Distinguish between solution of cubic equations and Bi-quadratic equations.

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setter: Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Hermitian, Skew-Hermitian, Orthogonal and Unitary matrices, Linear independence/dependence of row and column vectors, Elementary operations on matrices, Inverse of a matrix using Gauss Jordan method, Row rank, column rank and their equivalence, System of linear equations and conditions for consistency

Unit-II

Eigen values, Eigen vectors and the characteristic equation of a matrix, Cayley-Hamilton Theorem and its applications, Polynomials, zeros of a polynomial, division algorithm, greatest common divisor, repeated roots, equal roots, unique factorization of polynomials over fields, The fundamental theorem of algebra.

Unit-III

Relationship between roots and the coefficients, Fundamental theorem of symmetric polynomials (without proof). Evaluation of symmetric functions of roots, Rational roots of polynomials with integral coefficients. Descartes rule of sign.

Unit-IV

Strum's theorem (statement only), Solution of cubic equation using Cardano's method, and biquadratic equation by Descartes method and Ferrari's method.

Text Book:

R. Kumar, Algebra & Trigonometry, Pardeep publication, Jalandhar, Sixteenth edition, 2003.

Reference Books:

1. A. Kurosh, Higher Algebra, Moscow Mir Publisher, 1972.
2. R.N. Gupta, S. Singh and R.J. Hans-Gill, Theory of Equations. (Lecture notes for inter University Leadership project in Mathematics.)
3. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., 2004.
4. P.B. Bhattacharya, S.K. Jain and S.R. Nagpal, First course in Linear Algebra, Wiley Eastern, New Delhi 1983.
5. S. Narayan & P.K. Mittal, A Text Book of Matrices, S. Chand & Co. Ltd., New Delhi, 2010.
6. J. Gilbert & L. Gilbert, Linear Algebra and Matrix Theory, Academic Press, Reprint 1995.

Bachelor of Science (Honours) Mathematics Semester–II

Session-2022-23

Course Title: Solid Geometry

Course Code: BOML-2335

Course Outcomes

After passing this course, the students will be able to:

CO 1: Describe the concept of planes, its classification, and trace different types of conicoids by thoroughly understanding shifting of origin and rotation of axis.

CO 2: Understand the geometry of sphere in depth including the concepts of tangent, normal and intersection.

CO 3: Demonstrate the concept of cone, classification of cone, intersection of line and cone, reciprocal cone. They will be able to understand the concept of cylinder including enveloping cylinder and its limiting form.

CO 4: Manage to find surface of revolution and identify the conicoids and represent it in the form of hyperboloid, ellipsoid, paraboloid.

Bachelor of Science (Honours) Mathematics Semester–II
Session-2022-23
Course Title: Solid Geometry
Course Code: BOML-2335

Examination Time: 3 Hours

Max. Marks: 100
Theory: 80
CA: 20

Instructions for the Paper Setter: Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

Unit-I

Intersection of three planes, condition for three planes to intersect in a point or along a line or to form a prism, change of axes, shift of origin, rotation of axes, sphere and section of a sphere by a plane. Sphere through a given circle. Intersection of a line and sphere.

Unit-II

Tangent and normal, tangent plane, angle of intersection of two spheres and condition of orthogonality, power of a point w.r.t. a sphere, Radical planes, radical axis, radical centre, coaxial family of spheres, limiting points.

Unit-III

Cylinder: Cylinder as surface generated by a line moving parallel to a fixed line and through fixed curve. Right circular cylinder, enveloping cylinder, Cone: homogeneous equation of cone in second degree in x, y, z , Quadratic cone, reciprocal cone, right circular cone, enveloping cones.

Unit-IV

Surface of revolution, Identification of quadratic surfaces: Ellipsoid, hyperboloid, paraboloid.

Text Book

P.K Jain and K.Ahmed, A text book of Analytical Geometry of three dimensions, Wiley Eastern Ltd, New Delhi, 2nd edition, 1994.

Bachelor of Science (Honours) Mathematics Semester–II
Session-2022-23
Course Title: Dynamics
Course Code: BOML-2336

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate the basic relations between distance, time, velocity and acceleration, manage to solve the problems of Newton's Laws of Motion and the motion of particles connected by a string.

CO 2: Illustrate motion along a smooth inclined plane. Solve different types of problems with Variable Acceleration. Discuss Simple Harmonic Motion.

CO 3: Understand the concept of projectile, oscillating system.

CO 4: Define Work, Power and Energy and explain their relationship. Use measurement tools to apply the concepts of Work and power to solve real life problems. Identify the different types of energy.

Bachelor of Science (Honours) Mathematics Semester–II

Session-2022-23

Course Title: Dynamics

Course Code: BOML-2336

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setter: Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

Unit-I

Rectilinear motion in a straight line with uniform acceleration, Newton's laws of motion.
Motion of two particles connected by a string.

Unit-II

Motion along a smooth inclined plane. Variable acceleration. Simple Harmonic Motion.

Unit-III

Curvilinear motion of particle in a plane, Definition of velocity and acceleration, projectiles.
Oscillations: Free Vibrations, Simple Pendulum, Conical Pendulum.

Unit-IV

Work, Power and Energy: Kinetic and Potential energy, Conservative forces. Theorem of conservation of energy. Work done against gravity.

Text Book:

R. Kumar, Fundamentals of Dynamics, Pardeep Publications, Jalandhar city, second edition, 2004

Reference Books:

1.F. Chorlton, Text Book of Dynamics, CBS Publishers, New Delhi, second edition, 2004 (Scope in chapters 3,8).

2. S.R. Gupta, Elementary Analytical Dynamics, Sultan Chand and Company, New Delhi, Fourteen Edition, 1983(Scope in chapters 1,2,3)

B.Sc. (Hons.) Mathematics Semester–II

(Session 2022-23)

Course Name: Modern Physics

Course Code: BOMM-2396

Course Outcomes

On passing this course the students will be able to

CO1: understand wave particle duality and use of this duality in studying crystal structure.

CO2: understand radioactivity and use of radio isotopes and radiation.

CO3: understand working and uses of nuclear radiation detectors.

CO4: Know about elementary particles and cosmic rays, their properties and conservation rules.

B.Sc. (Hons.) Mathematics Semester–II

(Session 2022-23)

Course Name: Modern Physics

Course Code: BOMM-2396

Examination Time: 3 Hours

Passing marks: 35%

Total Teaching hours: 60

Max. Marks: 100

Theory:60

Practical:20

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question carries 12 marks

Section-A

Dual Nature of Matter and Radiation: De Broglie's hypothesis, electron diffraction experiments of Davisson and Germer, Wave group and particle velocities, Heisenberg's uncertainty principle, principle of the electron microscope, Diffraction of X-rays from crystals, Planck's quantum hypothesis, Bragg's law of determination of structure of simple crystals.

Section-B

Radioisotopes and their Application: Radioactive decay laws, Uranium and Carbon dating, introduction to α , β and γ decays, Radioisotopes, their production and separation, mass spectrograph, uses of radioisotopes in medicine, agriculture and geology Radiation doses and their units, Biological effects of radiation.

Section-C

Nuclear detection: Principle, construction and application of gas-filled detectors Ionization detector, proportional counter, Geiger Muller detector, Cloud chamber, Scintillation counter and photographic emulsions as detectors.

Section-D

Elementary particles and cosmic rays, Classification of elementary particles and their properties, conservation laws. Antiparticles, Origin and general characterization of cosmic rays (Primary and Secondary)

Suggested Readings:

1. Concepts of Modern Physics: A. Beiser.
2. Essentials of Modern Physics: V. Acota and C. L. Grown
3. Fundamentals of Modern Physics: B.D. Duggal and C. L. Chhabra
4. Radiation and Particle Physics by KS Thind, Vishal Publications

B.Sc. (Hons.) Mathematics (Semester-II)
(Session 2022-23)

COURSE CODE: BOMM-2396(P)
Physics Lab-II
(Practical)

Maximum Marks: 20

Examination Time: 3 Hour

Pass Marks: 35%

Instructions to Practical Examiner

Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar

General Guidelines for Practical Examination

I. The distribution of marks is as follows: **Marks: 20**

i) One experiment **7 Marks**

ii) Brief Theory **3 Marks**

iii) Viva–Voce **5 Marks**

iv) Record (Practical file) **5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment is to be allotted to more than three examinees in any group.

1. To Study characteristics of a solar cell.
2. To determine the ionization potential of mercury.
3. To study the photoelectric effect and determine the value of Planck's constant.
4. Study of variation of light intensity with distance using photovoltaic cell(Inverse SquareLaw).
- 5.To determine e/m ratio of electron using long solenoid method.
6. To draw the plateau of a GM counter and find the operating voltage of GM tube.
7. To study the absorption coefficient beta particles in aluminium using GM counter and find the absorption coefficients.
8. Study of C.R.O. as display and measuring device, Study of Sine wave, square wave signals
9. To measure an accessible distance between two points using a sextant.
- 10.To measure an inaccessible distance between two points using a sextant.

Text and Reference Books:

1. Practical Physics Vol.II, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications
2. Practical Physics, C.L. Arora, S. Chand & Co.

Bachelor of Science (Honours) Mathematics Semester–II**Session 2022-23****Course Code: BOMM-2137****Computer Fundamentals and Introduction to C Programming Language****Course Outcome:**

After passing course the student will be able to:

CO1: Articulate various kind of software and hardware used in computers.

CO2: Work with different set of operations in C programming.

CO3: Apply various control statements of C Programming Language for designing solutions to different real world problems.

CO4: Implement single and multidimensional arrays for representing complex data collections.

Bachelor of Science (Honours) Mathematics Semester–II

Session 2022-23

Course Code: BOMM-2137

Computer Fundamentals and Introduction to C Programming Language

Examination Time: (3+3) Hrs.

Max. Marks: 100

Theory: 50

Practical: 30

CA: 20

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

UNIT-I

Introduction : Early computing devices, diverse uses of computers, block diagram, use of CPU and I/O devices, software and hardware, application software and system software, primary and secondary storage devices, Flowcharts and algorithms.

UNIT-II

Introduction to 'C' language: Tokens, Identifiers, Keywords, constants and literals, Data types. Operators: arithmetic, relational and logical, precedence and order of evaluation

UNIT-III

Control Statements: Decision control, loop control and case control. Functions and storage classes.

UNIT-IV

Arrays: initializing an array. one dimensional arrays: array manipulation; searching, insertion, deletion of an element from an array; finding the largest/smallest element in array; two dimensional arrays, addition/multiplication of two matrices, program to transpose a square matrix; null terminated strings as array of characters.

References / Textbooks:

1. E. Balagurusamy, Programming in ANSI C, Tata McGraw-Hill (2002), 5th edition.
 2. Stephen G. Kochan, Programming in C, Pearson Education (2015), 4th edition.
 3. Rachhpal Singh, Gurvinder Singh, Windows based computer courses, Kalyani Publishers (2011).
 4. Yashwant Kanetkar, Let us C, BPB Publications (2020), 17th edition.
 5. R.S. Salari, Application Programming in C, Khanna Book Publishing (2012), 4th edition.
- Anshuman Sharma, Learn programming in C, Lakhanpal Publishers (2016), 7th edition

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Scheme and Curriculum of Examinations of Three-Year Degree Programme
Bachelor of Science (Honours) Mathematics
Semester-III
Session- 2022-23

Bachelor of Science (Honours) Mathematics Semester-III								
Sr.	Course	Course	Course	Max.Marks				Examination
No.	Code	type	Title	Total	Ext.		CA	Time in
					L	P		hours
1	BOML-3331	C	Calculus III	100	80	-	20	3
2	BOML-3332	C	Ordinary Differential Equations and Special Functions	100	80	-	20	3
3	BOML-3333	C	Probability Theory	100	80	-	20	3
4	BOML-3334	C	Linear Algebra	100	80	-	20	3
5	BOMM-3135	C	Python Programming	100	50	30	20	3+3
6	AECE-3221	AC	* Environmental Studies (Compulsory)	100	60	20	20	3
7	SECP-3512	AC	* Personality Development	25	20	-	5	1
Total Marks				500				

Note:

* Marks of these papers will not be added in total marks and only grades will be provided

C-Compulsory

AC-Audit Course

Bachelor of Science (Honours) Mathematics

Semester–III

Session- 2022-23

Course Title: Calculus III

Course Code: BOML-3331

Course Outcomes

After passing this course, the students will be able to:

CO1: Evaluate Partial derivatives, Limits and continuity, Homogenous Functions, Euler's Theorem and recognize the various notations used in partial derivatives.

CO2: Analyze functions using Chain Rule, Jacobians, Directional Derivatives and Gradient Vectors.

CO3: To find optimization value for a function of two variables.

CO4: Apply double integration technique in finding the area of a region and triple integrals to find volume.

Bachelor of Science (Honours) Mathematics
Semester–III

Session- 2022-23

Course Title: Calculus III

Course Code: BOML-3331

Examination Time: 3 Hours

Max. Marks:100

Theory:

80

CA:20

Instructions for Paper Setter

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Real Valued functions of several variables with emphasis on functions of two variables, Limits and continuity, Partial derivatives, Homogenous Functions, Euler's Theorem

Unit II

Total differentiation, Differentiation of composite functions, Implicit functions, Chain Rule, Jacobians, Directional Derivatives, Gradient Vectors.

Unit III

Saddle Points, Maxima and Minima of functions of two variables, Lagrange's Multiplier method, Higher dimensional analogues of Lagrange's Mean value Theorem and Taylor's theorem for functions of two variables.

Unit IV

Double integration over rectangular and non-rectangular regions, change of order of integration, double integration in polar co-ordinates, triple integration over parallelepiped and other solid regions, Applications of double and triple integrals to area, volume, centre of gravity, moment of inertia etc.

Text Book:

George B. Thomas and Ross L. Finney, Calculus and Analytic Geometry, Pearson publication, 9th Edition, 1998. (Scope as in Ch.12-13)

Reference Books:

1. Sudhir R. Ghorpade and B.V. Limaye, A course in calculus and real analysis, Springer, 2006.
2. E. Kreyszig, Advanced Engineering Mathematics, Wiley Publication, 10th Edition, 2011.

Bachelor of Science (Honours) Mathematics
Semester–III

Session- 2022 -23

Course Title: Ordinary Differential Equations and Special Functions

Course Code: BOML-3332

Course Outcomes

After the successful completion of this course, the students will be able to:

CO1: Identify differential equation, its order and degree, exact differential equations. Solve equations of first order and higher degree and demonstrate the concept of Linear Differential equation with constant coefficients.

CO2: Demonstrate the concept of linear differential equations with variable coefficients and find its solution using power series method

CO 3: Understand the concept of Bessel's Function with their properties like Orthogonal Property, Recurrence Relations, and Generating Function etc. and to recognize some of the Partial Differential Equations that can be solved by application of Bessel Function.

CO 4: Understand the concept of Legendre's Function with their properties like Orthogonal Property, Recurrence Relations, Rodrigue's formula and Generating Function etc. and to recognize some of the Partial Differential Equations that can be solved by application of Legendre Function.

Bachelor of Science (Honours) Mathematics
Semester–III

Session- 2022-23

Course Title: Ordinary Differential Equations and Special Functions

Course Code: BOML-3332

Examination Time: 3 Hours
Marks: 100

Max.

Theory: 80
CA: 20

Instructions for Paper Setter:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit –I

Exact differential equations. First order and higher degree equations solvable for x , y , p . Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Orthogonal trajectories. Linear differential equations with constant coefficients.

Unit II

Linear differential equations with variable coefficients, Variation of Parameters method, reduction method, series solutions of differential equations. Power series method, Bessel and Legendre equations (only series solution).

Unit III

Bessel's Functions: Recurrence relations, Generating Function, Orthogonal Property, Trigonometric Expansions involving Bessel's Functions.

Unit –IV

Legendre's Functions: Recurrence Relations, Generating Function, Rodrigue's Formula, Orthogonal Property, Trigonometric Series, Laplace definite integrals, Christoffel's expansion

Text Book:

M.D.Raisinghania, Ordinary and Partial Differential Equations, S Chand Publishing, New Delhi, 11th Edition, 2009.

Reference Books:

1. E.A. Coddington, An Introduction to Ordinary Differential Equations, Dover Publications, Inc., New York.
2. D.A.Murray, Introductory Course in Differential Equations, Orient Longman Private Limited, Hyderabad, 11th edition, 2003.
3. G.F.Simmons, Differential Equations, McGraw Hill Education, 2nd edition, 2017.
4. E.D. Rainville, Special Functions, The Macmillan Company, New York.

Bachelor of Science (Honours) Mathematics

Semester–III

Session- 2022-23

Course Title: Probability Theory

Course Code: BOML-3333

Course Outcomes

After passing this course, the students will be able to:

CO1: Translate the real world problem into probability based mathematical model. They will be able to analyze, examine and control real time data.

CO2: Distinguish between discrete and continuous random variable primarily in their application and usage in real life.

CO3: Apply general properties and applications of expectation, variance and moments.

CO4: Identify the characteristics of different continuous and discrete distribution. In

particular they will be able to differentiate between widely used events with Binomial and Poisson distribution; and apply Normal distribution in real time applications.

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Bachelor of Science (Honours) Mathematics
Semester–III

Session-2022-23

Course Title: Probability Theory

Course Code: BOML-3333

Examination Time:3 Hours

Max.

Marks:100

Theory: 80

CA: 20

Instructions for Paper Setter: Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The students can use only Non Programmable& Non Storage Type Calculator and statistical tables.

The question paper must contain 30% of the article/theory from the syllabus.

Unit I

Measures of central tendency: Mean, Median, Mode, and Measure of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Skewness, Kurtosis,

Sample Space, Probability axioms, Probability on finite sample space, Conditional probability and Independence, Baye's theorem.

Unit II

Random variables, Probability mass function, Probability density function, Distribution function, Function of a random variable and its distribution. Multiple random variables, Joint distribution, Marginal and Conditional distributions.

Unit III

Mathematical Expectation, Conditional Expectation, Variance, Covariance, Moments, Moment generating function, Chebychev's inequality, Bernoulli's Law of large numbers.

Unit –IV

Discrete Probability Distributions: Bernoulli, Binomial, Poisson, Negative Binomial, Geometric distribution. Continuous Probability Distributions: Uniform, Normal, Gamma, Beta, Exponential distribution (For All distributions only Mean, Variance, Moment Generating Function)

Text Book:

S.C Gupta and V.K Kapoor: Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi, 11th edition, 2018. (Scope in Chapters 2-8).

Reference Book:

A.M. Mood , F.A. Graybill , D.C. Boes: Introduction to the Theory of Statistics, Chennai: McGraw Hill Education (India) Pvt. Ltd, 3rd edition, 2017.

Bachelor of Science (Honours) Mathematics Semester–III

Session- 2022-23

Course Title: Linear Algebra

Course Code: BOML-3334

Course Outcomes

After passing this course, the students will be able to:

CO1: Express the algebraic concepts such as binary operation, groups, rings

and fields. Define a vector space and subspace of a vector space and check the linear dependence and linear independence of vectors

CO2: To understand the concepts of basis and dimension of vector space.

CO3: To understand matrix representation of a linear transformation

CO4: To find rank and normal form of a matrix, invertible matrix and to solve system of linear equations.

Bachelor of Science (Honours) Mathematics

Semester-III

Session-2022-23

Course Title: Linear Algebra

Course Code: BOML-3334

Examination Time: 3 Hours

Max. Marks: 100

Theory: 80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Definition and examples of vector spaces, properties of vector spaces, subspaces, examples of subspaces, sums and direct sums of subspaces, finite dimensional vector space: span of a list of vectors, linear independence and dependence of vectors.

Unit II

Basis of a vector space, extension of a list to a Linear Independent basis, reduction of a spanning list to a basis, direct complement of subspace, dimension theorems, quotient space, dimension of a quotient space.

Unit III

Linear maps, Null space, Range space, Rank-Nullity Theorem, Matrix of a linear map, invertibility of a linear map, algebra of linear maps.

Unit IV

Elementary matrix operations, elementary matrices, rank of a matrix, equality of row and column rank, normal form for a matrix, invertible matrix as a product of elementary matrices, system of linear equations

Text Book:

S. Axler, Linear Algebra Done Right, Springer, Second edition, 1997.

Reference Books:

1. S. H. Friedberg, A.J. Insel and L.E. Spence., Linear Algebra, PHI Learning Pvt. Ltd, New Jersey, 1979
2. V. Sahai and V. Bist., Linear Algebra, Narosa Publishing House Pvt. Ltd, Delhi, 2013

Bachelor of Science (Honours) Mathematics Semester III

Session 2022-23

PYTHON PROGRAMMING

Course Code: BOMM-3135

Course Outcomes:

After completion of this course, the students will be able to:

CO1: Comprehend basics of Python programming like operators, data types, I/O, etc.

CO2: Apply various control statements of Python Programming Language for designing solutions to different real world problems.

CO3: Implement various built-in and user defined function, packages and modules to solve mathematical problems.

CO4: Apply different matrix operations using NumPy and perform file manipulations.

Bachelor of Science (Honours) Mathematics Semester III

Session 2022-23

PYTHON PROGRAMMING

Course Code: BOMM-3135

Examination Time: (3+3) Hours

Max. Marks: 100

Theory: 50

Practical: 30

CA: 20

Instructions for the Paper Setters:

Eight questions of equal marks (10 marks each), (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

UNIT I

Introduction to python and Setting up the Python development Environment, Basic syntax, interactiveshell, editing, saving, and running a script, Concept of data types, Declaring and using Numeric datatypes: int, float, complex Lists and Tuples and their basic operations, Python console Input / Output.Arithmetic operators and expressions, Conditions, Comparison operators, Logical Operators, Is and Inoperators.

UNIT II

Calculation of area, surface area and volume of geometrical objects. String Handling, Unicode strings, Strings Manipulation: - compare strings, concatenation of strings,slicing strings in python, converting strings to numbers and vice versa. Dictionaries Controlstatements: if-else, Nested If-Else, Loops (for, while) Loop manipulation using pass, continue, breakand else.

UNIT III

Built in function and modules in python, user defined functions, passing parameters, arguments and return values; formal vs actual arguments, Lambda function in python, Recursion, organizing python codes using functions, modules and external packages.

Math Module: Constants, Arithmetic functions, Power functions, Logarithmic functions, Trigonometric and Angular functions.

UNIT IV

Matrix operations using NumPy array (Multiplication. Addition, matrix multiplication, inverse, determinant, adjoint, Eigenvalues, etc).

Files: manipulating files and directories, OS and Sys modules; creating and reading a geometric file (csv or tab separated) understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Manipulating file pointer using seek. Introduction to graphic. **Plotting graphs and objects.**

References / Textbooks:

1. Mark Lutz, Learning Python, O'Reilly Media, 2013.
2. David Beazley, Python cookbook, O'Reilly Media, 2013.
3. David Beazley, Python Essential Reference, Addison-Wesley Professional, 2009.
4. John Zelle, Python programming: An Introduction to Computer Science, Franklin, Beedle & Associates Inc, 2004.
5. Alex Mortelli, Python in a Nutshell, O'Reilly Media, 2006.

Note: The latest editions of the books should be followed.

PERSONALITY DEVELOPMENT

Course Title: Personality Development

Nature of course: Audit Course (Value added)

Course duration: 30 hours

Course intended for: Semester III students of Under Graduate Program

- B.Sc (Economics)
- B.Sc. (Economics) with additional
- Course of Banking
- B.Sc. (Bio- Technology)
- B.Sc. (Medical)
- B.Sc. (Hons.) Physics
- B.Sc. (Hons.) Mathematics
- B.Sc. (Non -Medical)
- B.Sc. (Computer Science)
- B.C.A
- B.Sc.(Information Technology)
- B. Voc. (Animation)
- B. Voc. (Retail Management)
- B. Voc.(Management & Secretarial Practices)
- B. Voc(Textile Design & Apparel Technology)
- B.Voc(Nutrition, Exercise & Health)
- B. Voc.(Beauty & Wellness)
- B. Voc. (Hospitality and Tourism)
- B. Voc(Artificial Intelligence & Data Science)

Course credits: 2 (For Credit based Continuous Evaluation Grading System)

Course Code: SECP-3512

PURPOSE

To enhance holistic development of students and improve their employability skills.

INSTRUCTIONAL OBJECTIVES

- To re-engineer attitude and understand its influence on behaviour.
- To develop inter-personal skills and be an effective goal-oriented team player.
- To develop communication and problem solving skills.
- To develop professionals with idealistic, practical and moral values.

LEARNING OUTCOMES

- On completion of the course, students will be able to hone their personality by
- Realisation of the importance and incorporation of positive thinking and attitude in life
- Enhancement of self confidence and analysis of self capabilities
- Learning the different communication skills for self expression

- Effective use of time to combat stress and increase in productivity
- Enhancing personality by physical grooming and fitness
- Understanding the role of design principles and appropriateness of apparel
- Incorporating social etiquettes in daily life and conduct
- Excelling in decision making and leadership qualities

CURRICULUM

Course credits-2

Total Contact Hours-30

MODULE	TITLE	HOURS
1.	Positive Thinking & Attitude	2
2.	Self Analysis & Self Confidence	2
3.	Communication Skills	10
	<ul style="list-style-type: none"> • Basic Communication Skills • Body Language • Interview Skills • Résumé Writing • Group Discussion • Telephone and E-mail etiquette • Public Speaking 	
4.	Time Management	2
5.	Stress and Conflict Management	2
6.	Physical Fitness and Personal Grooming	2
7.	Appropriateness of Apparel	2
8.	Social Etiquette	2
9.	Decision Making process & Problem Solving Skills <ul style="list-style-type: none"> • Leadership Skills • Goal Setting • Motivation 	5
10.	Closure	1

EXAMINATION

1. Total marks of the course will be 25 (Final Examination: 20 Marks; Internal Assessment: 5Marks)
2. The pattern of the final examination will be multiple choice questions. 25 multiple choice type questions will be set. The student shall attempt 20 questions. Each question will carry 1 mark (20 X 1 = 20). Total time allotted will be 1 hour.
3. Internal Assessment will consist of Attendance: 2 Marks, Internal: 3 Marks.(Total Internal Assessment:5 Marks)

SYLLABUS

MODULE 1: Positive Thinking & Attitude

- Factors Influencing Attitude
- Essentials to develop Positive Attitude
- Challenges & lessons from Attitude

MODULE 2: Self Analysis & Self Confidence

- Who am I
- Importance of Self Confidence
- SWOT Analysis

MODULE 3: Communication Skills

(i) Basic Communication Skills

- Speaking skills
- Listening skills
- Presentation skills

(ii) Body Language

- Forms of Non-Verbal Communication
- Interpreting body language clues
- Effective use of body language

(iii) Interview Skills

- Type of Interviews
- Ensuring success in job interviews
- Appropriate use of Non-verbal Communication

(iv) Résumé Writing

- Features
- Different types of résumé for Different posts

(v) Group Discussion

- Difference between Group discussion and debate
- Importance of Group Discussion
- Group Decision
- Ensuring success in group discussions

(vi) Telephone & E-mail Etiquette

- Telephone etiquette
- E-mail etiquette

(vii) Public Speaking

- Introductory speech
- Informative speech
- Persuasive speech
- Extempore session

MODULE 4: Time Management

- Importance of time management
- Values & beliefs
- Goals and benchmarks – The ladders of success
- Managing projects and commitments
- Prioritizing your To-do's
- Getting the results you need

MODULE 5: Stress & Conflict Management

- Introduction to stress
- Types of stressors
- Small changes and large rewards
- Stress prevention
- Overcoming unhealthy worry
- Stress at home and workplace
- Dealing with frustration and anger
- Stress reducing exercises
- Understanding conflicts
- Violent and Non-violent conflicts
- Source of conflict
- Structural and cultural violence

MODULE 6: Physical Fitness and Personal Grooming

- Fitness and exercise
- Balanced & healthy diet
- Skin care & Hair care
- Make-up skills

MODULE 7: Appropriateness of Apparel

- Apparel & Personality
- Psycho-social aspects of apparel
- Style-tips for smart dressing & effective use of design elements

MODULE 8: Social Etiquette

- Civic Sense
- Workplace skills
- Meeting and greeting people
- Table Setting and table manners

MODULE 9: Decision Making Process and Problem Solving Skills

- Anatomy of a decision
- How to use problem solving steps and problem solving tools
- How to distinguish root causes from symptoms to identify right solution for right problems
- How to improve problem solving and decision making by identifying individual problem solving styles
- The creative process for making decisions
- Tools to improve creativity
- Implementing the decision – Wrap up

(i) Leadership Skills

- Handling peer pressure and bullies
- Team work
- Decision making
- Taking initiatives

(ii) Goal Setting

- Wish list
- SMART goals
- Blueprint for success
- Short-term, Long-term, Life-term Goals

(iii) Motivation

- Factors of motivation
- Self talk
- Intrinsic & extrinsic motivators

Books Recommended

1. Rossi, P.(2011).*Everyday Etiquette: How to navigate 101 common and uncommon social situations*. St Martins Pr.
2. Pietrzak, T.,& Fraum,M. (2005). *Building career success skills*. ASTD Press.
3. Treffinger, D.J., Isaksen, S.G., & Brian, K. (2005). *Creative problem solving: An Introduction*.
4. Carr, A. (2004).*Positive Psychology: The science of happiness and human strengths*. Burnner-Routlrdge.
5. Oberg, B.C. (1994).*Speech craft: An Introduction to public speaking*. Meriwether Publishing.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

Scheme and Curriculum of Examinations of Three-Year Degree Programme
Bachelor of Science (Honours) Mathematics Semester-IV
Session: 2022-23

Bachelor of Science (Honours) Mathematics Semester-IV							
Course Code	Course Type	Course Title	Max.Marks				Examination time in hours
			Total	Ext.		CA	
				L	P		
BOML-4331	C	Vector calculus	100	80	--	20	3
BOML-4332	C	Partial Differential Equations	100	80	--	20	3
BOML-4333	C	Group Theory	100	80	--	20	3
BOMM-4334	C	Statistical Methods	100	50	30	20	3+3
BOMM-4135	C	Foundation of Statistical Computing	100	50	30	20	3+3
SECS-4522	AC	*Social Outreach	25	-	20	5	No Exam
		Total Marks	500				

Note:

*Marks of these papers will not be added in total marks and only grades will be provided.

C Compulsory

AC Audit Course

Bachelor of Science (Honours) Mathematics Semester-IV

Session: 2022-23

Course Title: Vector Calculus

Course Code: BOML-4331

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the physical concept of vectors and perform basic calculus on vector-valued functions.

CO 2: Solve physical problems based on calculus using vector-valued functions and calculate the tangent vector and normal vector at a point on a space curve described by a vector-valued position function.

CO 3: Find the values of gradient, divergence and curl operator of given vectors in orthogonal system and understand the concept of line integral.

CO 4: Find the application of Gauss theorem and Stokes's theorem in real life problems.

Bachelor of Science (Honours) Mathematics
Semester-IV
Session-2022-23
Course Title: Vector Calculus
Course Code: BOML-4331

Examination Time: 3 Hours

Max. Marks: 100

Theory: 80

CA: 20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Scalar and vector product of three vectors, Product of four vectors, Reciprocal vectors, Vector differentiation, Scalar valued point functions, Vector valued point functions, Directional derivatives and the Gradient, Tangent plane and normal to a given surface.

Unit II

Gradient of a scalar point function, Divergence and Curl of a vector point function, Divergence and Curl of sums and products and their related vector identities, Laplacian operator.

Unit III

Orthogonal Curvilinear Coordinates, Conditions for orthogonality, Gradient, Divergence and Curl in terms of orthogonal curvilinear coordinates, Line integrals: Scalar and vector line integrals, line integrals along curves, Work done, Conservative vector fields, Green's theorem in plane.

Unit IV

Surface integral, Volume integral, Gauss Divergence Theorem, Stokes theorem and the problems based on these theorems.

Reference Books:

1. D. E. Bourne and P. C. Kendall, Vector analysis and Cartesian tensors, CRC Press, Taylor and Francis Group, London, Third edition, 1992 (Scope as in Chapters: 2-6)
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 42nd edition, 2012 (Scope as in Chapters: 3 (3.8-3.10) and 8)

Bachelor of Science (Honours) Mathematics Semester-IV

Session: 2022-23

Course Title: Partial Differential Equations

Course Code: BOML- 4332

Course Outcomes

After passing this course, the students will be able to:

CO 1: Formulate partial differential equations & Apply Langrange's Method to find solutions of partial differential equations and understand basic properties of standard partial differential equations.

CO 2: Perform various methods to solve homogeneous partial differential equations and apply Charpit method in solving problems.

CO 3: Use computational tools to solve Non homogeneous linear P.D.E. with constant coefficients, reducible and irreducible linear P.D.E. with constant coefficients, method of finding the complementary function and particular integral.

CO 4: Classify and transform partial differential equations into canonical form.

Bachelor of Science (Honours) Mathematics Semester-IV
Session: 2022-23
Course Title: Partial Differential Equations
Course Code: BOML- 4332

Examination Time: 3 Hours

Max. Marks: 100

Theory: 80

CA : 20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Partial Differential Equations of First Order: origin of first order partial differential equations. Formation of partial differential equations, Cauchy problem of first order equations, Linear P.D.E. of first order, Lagrange's Method

Unit-II

Integral surface through a given curve, Surface orthogonal to given system of surfaces, Non linear P.D.E of first order, Charpit's method, Homogeneous linear P.D.E. with constant coefficients, method of finding the complementary function and particular integral.

Unit-III

Non homogeneous linear P.D.E. with constant coefficients, reducible and irreducible linear P.D.E. with constant coefficients, method of finding the complementary function and particular integral.

Unit-IV

Partial differential equations of the second order. Origin of 2nd order equations. Linear P.D.E. with constant coefficients and their complete solutions. Second order equation with variable coefficient and their classification and reduction to standard form.

Text Book:

M D Raisinghania, Ordinary and Partial Differential Equations, S Chand Publishing, New Delhi, 11th Edition, 2009

Reference Books:

1. H.T.H. Piaggio: Differential equations, CBS Publishers
2. IAN N.Sneddon, Elements of partial differential equations, Dover Publisher, 2006

Bachelor of Science (Honours) Mathematics Semester-IV

Session: 2022-23

Course Title: Group Theory

Course Code: BOML - 4333

Course Outcomes

Upon completion of this course, students should be able to:

CO 1: Understand the concept of integers, divisors, division algorithm and equivalence relation and its classes.

CO 2: Demonstrate understanding of algebraic structures and its properties with regard to working with various number system. Understand the concept of groups, subgroups, centralizer, normalizer and various properties of groups.

CO 3: Explain the notion of cosets, normal subgroup, quotient group, cyclic group, generator of cyclic group.

CO 4: Describe all permutation concepts, order, permutation as a product of two cycles, even odd permutations, alternating group.

Bachelor of Science (Honours) Mathematics Semester-IV

Session: 2022-23

Course Title: Group Theory

Course Code: BOML – 4333

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Properties of Integers: Well ordering Principle, Division algorithm, Greatest common divisor, G.C.D. as a linear combination, Euclidean algorithm, Euclid's Lemma, Least common multiple, Fundamental Theorem of arithmetic, Integers modulo n , Binary relations, Equivalence relations, Equivalence classes partition.

Unit-II

Definition & examples of groups, Elementary properties of groups, Uniqueness of the identity element, Cancellation, Uniqueness of inverses, Subgroups, Examples of subgroups, Tests for a set to be a subgroup, Centralizer, Normalizer, Centre of a group.

Unit-III

Product of two subgroups, Properties of cosets, Lagrange's theorem, Normal subgroups, Factor groups, Cyclic groups, Properties of cyclic groups, Generators of cyclic groups, Fundamental theorem of cyclic groups.

Unit-IV

Permutation groups, Cyclic notation for permutations, Permutation as product of disjoint cycles, Order of a permutation, Commutativity of product of disjoint cycles, Permutation as a product of 2-cycles, Even and odd permutations, Alternating group.

Reference Books:

1. D. Burton, Elementary Number Theory, McGraw-Hill Education, New York, Seventh Edition, 2011 (Scope as in Chapters: 2, 3, 8).
2. J. A. Gallian, Contemporary Abstract Algebra, CRC Press, Taylor & Francis Group, New York, Ninth Edition, 2015 (Scope as in Chapters: 1-5, 7, 9).

Bachelor of Science (Honours) Mathematics Semester-IV
Session: 2022-23
Course Title: Statistical Methods
Course Code: BOMM-4334
Course Outcomes

Upon completion of this course, students should be able to:

CO 1: Understand the concept of correlation, and apply its techniques to identify correlation between given set of data and regression curves depicting relation among the physical quantities.

CO 2: Understand all the concepts related to sampling distribution.

CO 3: Demonstrate understanding the logic and framework of the inference of hypothesis testing as making an argument.

CO 4: Interpret the results of the hypothesis test.

Bachelor of Science (Honours) Mathematics Semester-IV

Session: 2022-23

Course Title: Statistical Methods

Course Code: BOMM-4334

Examination Time: (3+3) Hours

Max. Marks: 100

Theory: 50

Practical: 30

CA : 20

Instructions for the Paper Setters:

Eight questions of equal marks (10 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The students can use only Non Programmable & Non Storage Type Calculator and statistical tables.

The question paper must contain 30% of the article/theory from the syllabus.

Unit-I

Bivariate data, Karl–Pearson's correlation coefficient and its Properties, Spearman's rank correlation coefficient, fitting of straight line, regression analysis.

Unit-II

Sampling Distributions: Chi-square, t and F-distributions with their mean and variance. Relation between Chi-square, t and F-distributions.

Unit-III

Large Sample test (Z Test): Test of single mean and difference of means, test for single proportion and difference of proportions, t test for single mean and equality of means.

Unit –IV

Chi-square test - as goodness of fit and association of attributes, F-test as test of equality of population of variance.

Note:

Practical: Based on syllabus of Statistical Methods for inferential Statistics.

Text Book:

S.C Gupta, V.K. Kapoor, Fundamental of Mathematical Statistics, Sultan Chand & Sons, New Delhi, eleventh edition, 2019.

Reference Book:

R. V. Hogg, Joseph W. Mackean, and C. Allen, Introduction to Mathematical Statistics, Pearson Education, Sixth edition, 2009.

Bachelor of Science (Honours) Mathematics Semester-IV

Session: 2022-23

COURSE CODE: BOMM-4135

FOUNDATION OF STATISTICAL COMPUTING

Course Outcomes:

After passing this course the student will be able to:

CO1: Comprehend basics of Statistical Computing and managing data structures like vector, matrix, etc.

CO2: Create, operate and manage lists and data frames.

CO3: Apply control and I/O statements for generating outputs.

CO4: Simulate various descriptive and analytical algorithms using R language along with their visualization.

Bachelor of Science (Honours) Mathematics Semester-IV

Session: 2022-23

COURSE CODE: BOMM-4135

FOUNDATION OF STATISTICAL COMPUTING

Examination Time: (3+3) Hrs.

Max. Marks: 100

Theory: 50

Practical: 30

CA: 20

Instructions for Paper Setter -

Eight questions of equal marks (10 marks each) are to set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts(not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section

UNIT - I

Data Statistics: Sampling, Cumulative statistics, Statistics for Data frames, matrix objects and lists.

Introduction to R, Help functions in R, Vectors, Common Vector Operations, Using all and any function, subletting of vector. Creating matrices, Matrix operations, Applying Functions to Matrix Rows and Columns, Adding and deleting rows and columns, lists, Creating lists, general list operations, Accessing list components and values, applying functions to lists, recursive lists

UNIT - II

Creating Data Frames – Matrix-like operations in frames , Merging Data Frames, Applying functions to Data frames, Factors and Tables , factors and levels , Common functions used with factors , string operations

UNIT - III

Input/ Output: scan() , readline() Function, Printing to the Screen Reading and writing CSV and text file. Control statements: Loops, Looping Over Nonvector, Sets, if-else , writing user defined function, scope of the variable, R script file

UNIT - IV

Graphics in R: Graph Syntax ((title, xlabel, ylabel, pch, lty, col.), Simple graphics (Bar, Multiple Bar, Histogram, Pie, Box-Plot, Scatter plot, qqplot), Low-level and High-Level plot functions, par() command to generate multiple plots.

Note:

Practical: Based on simple mathematical problems and based on syllabus of Statistical Methods for descriptive Statistics.

References / Textbooks:

1. Andrie de Vries and Joris Meys, R Programming for Dummies, Wiley (2016), 2nd Edition.
2. Sandip Rakshit, R Programming for Beginners, McGraw Hill Education (2017), 1st Edition.
3. Sandip Rakhsit, Statistics with R Programming, McGraw Hill Education (2018), 1st Edition.
4. Garrett Golemund, Hands on Programming with R, O'Reilly (2014), 1st Edition
5. Mark Gardener, Beginning R: The Statistical Programming Language, Wiley (2013)
6. Tilman M. Davies, The Book of R: A first Course in Programming and Statistics, No Strach Press (2016), 1st Edition

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

Scheme and Curriculum of Examinations of Three Year Degree Programme
Bachelor of Science (Honours) Mathematics Semester-V
Session: 2022-23

Bachelor of Science (Honours) Mathematics Semester-V							
Course Code	Course Type	Course Title	Max. Marks				Examination time in hours
			Total	Ext.		CA	
				L	P		
BOML-5331	C	Number Theory	100	80	-	20	3
BOML-5332	C	Discrete Mathematics	100	80	-	20	3
BOML-5333	C	Linear Integral Equations	100	80	-	20	3
BOML-5334	C	Riemann Integration	100	80	-	20	3
BOML-5335	C	Metric Spaces	100	80	-	20	3
SECJ-5551	AC	* Job Readiness Course	25	20	-	5	
Total Marks			500				

Note:

*Marks of these papers will not be added in total marks and only grades will be provided.

C -Compulsory

AC-Audit Course

Bachelor of Science (Honours) Mathematics

Semester–V

Session 2022 -23

Course Title: Number Theory

Course Code: BOML-5331

Course Outcomes

Successful completion of this course will enable the students to:

CO 1: Find solutions of specified linear Diophantine equation and system of linear congruences.

CO 2: Apply Fermat's to prove relation involving prime numbers.

CO 3: Apply the Wilson's and Euler's theorem to solve numerical problems and explore properties of phi function in real world problems.

CO 4: Understand application of important arithmetic functions.

Bachelor of Science (Honours) Mathematics

Semester-V

Session 2022 -23

Course Title: Number Theory

Course Code: BOML-5331

Examination Time: 3 Hours

Max. Marks: 100

Theory: 80

CA: 20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

The question paper must contain 30% of the article/theory from the syllabus.

Unit-I

The Diophantine equation $ax + by = c$ and its solution, Basic properties of congruences, Complete and Reduced set of residues modulo n , Special divisibility tests.

Unit-II

Polynomial congruences, Lagrange's theorem, Linear congruences, Chinese remainder theorem, The Fermat's theorem, Pseudo prime, Absolutely Pseudo prime.

Unit-III

Wilson's theorem. Euler's Φ function, Euler's theorem, some properties of the Φ Function, Gauss theorem.

Unit-IV

Number-Theoretic functions: The Sum and Number of divisors, The Mobius Inversion formula, The Greatest integer function for treating divisibility problems.

Text Book:

D. Burton, Elementary Number Theory, McGraw-Hill Education, Boston, Seventh edition, 2012 (Scope as in Chapters 2, 4-7).

Bachelor of Science (Honours) Mathematics
Semester–V
Session 2022 -23
Course Title: Discrete Mathematics
Course Code: BOML-5332
Course Outcomes

Successful completion of this course will enable the students to:

CO 1: Understand Boolean algebra , K-Map and application of Boolean Algebra to switching circuits.

CO 2: Understand the use of Graphs and Models.

CO 3: Understand the language of trees with various types of trees and methods of traversing trees.

CO 4: Have substantial experience to comprehend formal logical and write an argument using logical notation and determine if the argument is valid or not.

Bachelor of Science (Honours) Mathematics
Semester–V
Session 2022 -23
Course Title: Discrete Mathematics
Course Code: BOML-5332

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit- I

Boolean Algebra – Boolean Algebra, Unary Operation, Binary Operation, Laws of Boolean Algebra, Principle of Duality, Boolean Function, Fundamental Product, Sum of Product form, Complete sum of Product form, Minterm, Disjunctive Normal form, Conjunctive Normal form, obtaining a Disjunctive Normal form, obtaining a Conjunctive Normal form, Karnaugh Map upto four variables, Applications of Boolean Algebra to Switching Circuits.

Unit- II

Graph, Subgraph, Paths, Directed and Undirected graphs, Connected graphs, Weakly connected graphs, Regular and bipartite graphs, Weighted graphs, Euler path and graphs, Hamiltonian path and graphs, planar graphs.

Unit- III

Chromatic number in graphs, shortest path in weighted graphs. Tree, directed tree, ordered tree, Binary tree, traversing binary tree, spanning tree, minimum spanning tree, Kruskal's algorithm to find minimum spanning tree.

Unit- IV

Propositional Calculus – Basic Logic Operations, Statement, Proposition, Propositional Variables, Truth Table, Combination of Propositions, Laws of the Algebra of Proposition, Variations in Conditional Statement, Principle of Duality, Logical Implication, Logical Equivalence of Proposition, Tautologies, Contradiction, Contingency, Argument, Proof of Validity, Quantifiers, Existential Quantifier, Universal Quantifier, Negation of Quantified Propositions, Propositions with Multiple Quantifier.

Text Book:

S. B. Gupta and C. P. Gandhi, Discrete Structures, University Science Press, Second edition, 2010 (Scope as in Chapters: 10, 11, 12, 13).

Bachelor of Science (Honours) Mathematics
Semester–V
Session 2022 -23
Course Title: Linear Integral Equations
Course Code: BOML-5333
Course Outcomes

On satisfying the requirements of this course, students will have the Knowledge of:

CO 1: Concept of Linear Integral equations and various kinds of Kernels, Volterra and Fredholm Integral equations of first and Second kind, reduction of initial value problem to a Volterra Integral equation and solution of Volterra Integral equation using method of Resolvent Kernel.

CO 2: Reduction of Boundary Value Problem to Fredholm Integral Equation and techniques to solve homogeneous and non-homogeneous Fredholm Integral equations.

CO 3: Laplace Transform and its basic properties and how to find solution of Volterra Integral Equations using Laplace Transform.

CO 4: Construction of Green's function and application of Green's function in finding the solution of Boundary Value Problem.

Bachelor of Science (Honours) Mathematics

Semester-V

Session 2022 -23

Course Title: Linear Integral Equations

Course Code: BOML-5333

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Linear integral equations of the first and second kind of Fredholm and Volterra type, some basic identities, Types of kernels: Symmetric kernel, Separable kernel, Iterated kernel, resolvent kernel, Initial value problems reduced to Volterra integral equations, Solution of Volterra integral equation using: Resolvent kernel, Successive approximation.

Unit-II

Boundary value problems reduced to Fredholm integral equations, Solution of Fredholm integral equations using separable kernel, resolvent kernel. Methods of successive approximation to solve Fredholm equations of second kind. Solution of Homogeneous Fredholm integral equation: Eigen values, eigen vectors.

Unit-III

Integral transforms for solving integral equations: Basic properties of Laplace transforms, Solution of Abel's equation using Laplace transform, Application of Laplace transform to the Solution of Volterra integral equations with convolution type kernels.

Unit-IV

Green's function, Basic four properties of the Green's function, Procedure for construction of the Green's function by using its basic four properties, Construction of Green's function for boundary value problems, Solution of boundary value problems using Green's function, reducing boundary value problems to an integral equation using Green's function.

Text Book:

M.D. Raisinghania, Integral Equations & Boundary Value Problems, S. Chand Co. Pvt. Ltd., New Delhi, First Edition, 2007 (Scope as in Chapters 1-6, 9, 11).

Bachelor of Science (Honours) Mathematics

Semester–V

Session: 2022-23

Course Title: Riemann Integration

Course Code: BOML-5334

Course outcomes

After passing this course, the students will be able to:

CO 1: To understand the concepts of Riemann sum, partitions, Upper and lower Riemann integrals, Refinement of partitions, Darboux's Theorem and Necessary and sufficient conditions for Integrability.

CO 2: To know and describe the Particular classes of Integrable functions, Properties of Integrable functions, Integrability of the sum, difference, product, quotient and modulus, First and second mean value theorems of integral calculus.

CO 3: Explain the concept of Improper Integrals and conditions for existence, Comparison test for convergence of improper integrals, Abel's Test and Dirichlet test for convergence.

CO 4: To distinguish between the absolute convergence and conditional convergence and find the relation between Beta and Gamma functions & their converging behaviour

Bachelor of Science (Honours) Mathematics

Semester–V

Session: 2022-23

Course Title: Riemann Integration

Course Code: BOML-5334

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Definition and Existence of the Riemann Integral, Partitions and Riemann (or Darboux) sums, Some properties of Darboux Sums, Upper and lower Riemann integrals, Refinement of partitions, Darboux's Theorem, Necessary and sufficient conditions for integrability.

Unit-II

Particular classes of Integrable functions, Properties of integrable functions, Integrability of the sum, difference, product, quotient and modulus, The Fundamental theorem of integral calculus, First and Second mean value theorems of integral calculus.

Unit-III

Improper Integrals and conditions for existence, Comparison test for convergence of improper integrals, Abel's Test and Dirichlet test for convergence.

Unit-IV

Absolute convergence and conditional convergence of improper integrals, Beta and Gamma functions, Properties of Beta functions, Recurrence formulae for Gamma function, Relation between Beta and Gamma functions.

Text Book:

S. Narayan and M. D. Raisinghania, Elements of Real Analysis, S. Chand & Co. Pvt. Ltd., New Delhi, Seventeenth Edition, 2016 (Scope as in chapters: 13, 16, 20).

Reference Books:

1. A. Kumar and S. Kumaresan, A Basic Course in Real Analysis, CRC Press, Taylor & Francis Group, New York, First Edition, 2014 (Scope as in chapters: 6).
2. S. C. Malik and S. Arora, Mathematics Analysis, New Age International Publishers, New Delhi, Second Edition, 2005 (Scope as in chapters: 9,11).

Bachelor of Science (Honours) Mathematics
Semester–V
Session: 2022-23
Course Title: Metric Spaces
Course Code: BOML-5335
Course outcomes

After passing this course, the students will be able to:

CO1: Explain the fundamental concepts of Metric Spaces and their role in modern mathematics.

CO2: Understand the concept of compact sets , separated sets and state and prove Heine – borel theorem

CO3: Demonstrate sequence in a metric space and give argument related to convergence.

CO4: Give argument related to continuity, completeness, compactness, connectedness in metric spaces.

Bachelor of Science (Honours) Mathematics

Semester–V

Session: 2022-23

Course Title: Metric Spaces

Course Code: BOML-5335

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Metric on a set, Metric space, definitions and examples, open sets, interior and closure of a set, closed set, dense and nowhere dense sets, exterior, frontier and boundary points and their properties.

Unit-II

Compact subsets of a metric space, elementary properties of compact sets, Heine-Borel theorem, separated sets, connected subsets of a metric space.

Unit-III

Sequences in a metric space, Convergent Sequences, Cauchy Sequences, Complete Metric Spaces, Cantor's Intersection Theorem, Baire's Category Theorem.

Unit-IV

Continuous Functions in a metric space, continuity and compactness, continuity and connectedness, discontinuities, monotonic functions, uniform continuity

Text Book:

S. Narayan and M. D.Raisinghania, Elements of Real Analysis, S. Chand & Company, New Delhi, 12th Edition, 2011 (Scope as in Chapter- 19)

Reference Books:

1.S. C.Malik and S. Arora, Mathematics Analysis, New Age International Publishers, New Delhi, 5th Edition, 2021 (Scope as in Chapter- 19)

2.W. Rudin, Principles of Mathematical Analysis, McGraw-Hill Education, New York, 3rd Edition, 1976 (Scope as in Chapters- 2, 3(3.1-3.12), 4)

Scheme and Curriculum of Examinations of Three Year Degree Programme

Bachelor of Science (Honours) Mathematics Semester-VI

Session: 2022-23

Bachelor of Science (Honours) Mathematics Semester-VI							
Course Code	Course Type	Course Title	Max. Marks				Examination time in hours
			Total	Ext.		CA	
				L	P		
BOML-6331	C	Complex Analysis	100	80	-	20	3
BOML-6332	C	Analytical Skills	100	80	-	20	3
BOML-6333	C	Numerical Analysis	100	80	-	20	3
BOML-6334	C	Special Functions	100	80	-	20	3
BOML-6335	C	Differential Geometry	100	80	-	20	3
Total Marks			500				

Note:

C -Compulsory

Bachelor of Science (Honours) Mathematics

Semester–VI

Session: 2022-23

Course Title: Complex Analysis

Course Code: BOML-6331

Course outcomes

After passing this course, the students will be able to:

CO1: Justify the need for a complex number system and explain how it is related to other existing number system. Define a function of complex variable, limit, continuity and differentiability, Analytic functions, Conjugate function, Cauchy Riemann equations, Harmonic function and carry out basic mathematical operations with complex numbers.

CO2: State and prove Cauchy's theorem, Cauchy's integral formula, Cauchy's inequality, Poisson's integral formula, Morera's theorem and Liouville's theorem.

CO3: Define singularities of a function, know the different types of singularities and be able to determine the Residue at singularities of a function.

CO4: Learn The Fundamental Theorem of Algebra, The Argument principle, Rouché's theorem, Conformal transformations, Bilinear transformations, Critical points, Fixed points, and Problems on cross ratio and bilinear transformation.

Bachelor of Science (Honours) Mathematics

Semester–VI

Session: 2022-23

Course Title: Complex Analysis

Course Code: BOML-6331

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Functions of complex variables, Topology of real line and complex plane, limit, continuity and differentiability, Analytic functions, Conjugate function, Cauchy Riemann equations (Cartesian form), Harmonic function, Construction of analytic functions.

Unit-II

Complex line integral, Cauchy's theorem, Cauchy's integral formula and its generalized form, Cauchy's inequality, Poisson's integral formula, Morera's theorem, Liouville's theorem.

Unit-III

Taylor's theorem, Laurent's theorem, Zeros and Singularities of an analytic function, Residue at a pole and at infinity, Cauchy's Residue theorem.

Unit-IV

The Fundamental Theorem of Algebra, The Argument principle, Rouché's theorem, Conformal transformations, Bilinear transformations, Critical points, Fixed points, The cross ratio, Problems on cross ratio and bilinear transformation.

Text Book:

S. Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, New Delhi, Second Edition, 1995 (Scope as in Chapters: 1-5).

Reference Books:

1. S. Narayan, Theory of Functions of a Complex Variable, S. Chand Co. Pvt. Ltd., New Delhi, Fourth Edition, 2009 (Scope as in Chapters: 3, 5, 7, 9, 11).

2. J. W. Brown and R. V. Churchill, Complex Variables and Applications, McGraw-Hill Education, New York, Eighth Edition, 2004 (Scope as in Chapters: 1, 2, 4, 5, 6, 7, 9).

Bachelor of Science (Honours) Mathematics

Semester–VI

Session: 2022-23

Course Title: Analytical Skills

Course Code: BOML-6332

Course outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of sequence and series, clock problems, blood relationship.

CO 2: Demonstrate procedural fluency with real number arithmetic operations and use these operations to represent real world scenarios and to solve stated problems and demonstrate number sense and conversion between fractions, decimals and percentages.

CO 3: Use simple and compound interest to do business calculations such as value of money, maturity value, present value, future value and able to differentiate which math method should be used for different problems and understand the concept of mensuration.

CO 4: Analyze data being presented in the form of tables, Venn diagrams, pie charts.

Bachelor of Science (Honours) Mathematics

Semester–VI

Session: 2022-23

Course Title: Analytical Skills

Course Code: BOML- 6332

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Sequence and Series: Analogies of Numbers and Alphabets, Completion of blank spaces following the pattern in A: b::C: d relationship, Odd thing out, Missing number in a sequence or a series.

Date, Time and Arrangement Problems: Calendar Problems, Clock Problems, Blood Relationship.

Unit -II

Arithmetic Ability: Algebraic operations BODMAS, Fractions, Decimals Fractions, Divisibility rules, LCM & GCD (HCF), Elementary Algebra.

Quantitative Aptitude: Averages, Ratio and proportion, Problems on ages, Time and Work, Work and Wages, Pipes and Cisterns, Time and Distance, Trains, Streams.

Unit -III

Mensuration: Measurement of Areas, Surface Areas and Volume.

Business Computations: Percentages, Profit & Loss, Partnership, Simple and Compound Interest.

Unit-IV

Data Analysis: The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn diagram or a Passage is to be analyzed and the questions pertaining to the data are to be answered.

Reference Books:

1. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, S. Chand Co. Pvt. Ltd., New Delhi, Eighth Edition, 2017 (Scope as in Chapters:1-4, 6, 8, 11-14, 16-20, 22-23, 27-28, 35 (Section I) and Chapters 36-39 (Section II)).

2. R.V. Praveen, Quantitative Aptitude and Reasoning, PHI Learning Pvt. Ltd., Delhi, Third Edition, 2016 (Scope as in Chapters: 1, 4-8, 13-21, 23-29, 32, 34, 36, 39 (Part I) and Chapters 1,3,5 (Part II)).

Bachelor of Science (Honours) Mathematics
Semester–VI
Session 2022 -23
Course Title: Numerical Analysis
Course Code: BOML-6333
Course Outcomes

After passing this course, the students will be able to:

CO 1. Know how to find the roots of transcendental equations.

CO 2. Perform computation for solving a system of equations and understand its application in all branches of engineering.

CO 3. Learn how to interpolate the given set of values and understand the curve fitting for various polynomials. They will be able to compute numerical integration and differentiation, numerical solution of ordinary differential equations.

CO 4. Learn numerical solution of differential equations.

Bachelor of Science (Honours) Mathematics
Semester–VI
Session 2022 -23
Course Title: Numerical Analysis
Course Code: BOML-6333

Examination Time: 3 Hours
Max. Marks: 100

Theory:80
CA:20

Instructions for the Paper Setter:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

The students can use only Non-Programmable& Non-Storage Type Calculator.

Unit-I

Error generation, error propagation, error estimation and error bounds, Solution of non-linear equations, Bisection method, Method of false position, Newton-Raphson method, Generalized Newton-Raphson method, Iteration method, Muller's method, Rate of convergence of these methods.

Unit-II

Solution of linear system of equation: Direct method, Gauss elimination variant (Gauss Jordan and Crout reduction), Triangular Method, Iterative methods: Jacobi's method, Gauss Seidel method. Finite Differences: Forward, Backward, Central, Divided differences, shift operator, relationship between the operators and detection of errors by use of difference operator. Interpolation with divided difference, Newton's formula, Lagrangian method.

Unit-III

Finite difference interpolation, Gauss formula, Stirling formula, Bessel's formula, Error Estimation, Extrapolation. Numerical differentiation: Method based on interpolation. Numerical Integration: Trapezoidal rule, Simpson's rule, Weddle rule, Romberg integration, Gaussian integration method, Gaussian legendre integration. Double numerical integration.

Unit-IV

Numerical solution of ordinary differential equations, Initial value problem, Taylor's method, Euler's methods, Picard's method, Milne's method, Runge-Kutta method, Predictor- Corrector's method.

Text Book:

M. K. Jain, S. R. K. Iyengar and R. K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Publishers, Delhi, Fifth edition, 2007 (Scope as in Chapters 2-6).

Bachelor of Science (Honours) Mathematics
Semester–VI
Session: 2022 -23
Course Title: Special Functions
Course Code: BOML-6334
Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of Hyper geometric function, its integral form and Contiguity of Hyper geometric functions and solution of hyper geometric equation as a function of its parameters.

CO 2: Understand the concept of Bessel's Function and their properties like Recurrence Relations, Generating Function etc., modified Bessel Function and to recognize some of the Partial Differential Equations that can be solved by application of Bessel Functions.

CO 3: Understand the concept of Legendre's Function and their properties like Orthogonal Property, Recurrence Relations, Rodrigue's formula and Generating Function etc. and understand Hyper geometric forms of Legendre's function.

CO 4: Understand the concept of Hermite Polynomials, basic properties like Orthogonality, Rodrigue's formula etc. and its relation with 2^F_0 .

Bachelor of Science (Honours) Mathematics
Semester–VI
Session: 2022 -23
Course Title: Special Functions
Course Code: BOML-6334

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Hypergeometric functions, The function $F(a,b,c,z)$, Integral form, Evaluation of $F(a,b,c,1)$, The contiguous function relations, The Hypergeometric differential equation, solution of hypergeometric equation, $F(a,b,c,z)$ as a function of its parameters, Relation between z and $1-z$, A quadratic transformation, A theorem due to Kummer.

Unit -II

Bessel's functions of first and second kind, Bessel's differential equation, Recurrence relations, Generating functions, Bessel's integral, Modified Bessel functions, Neumann polynomials, Neumann series.

Unit –III

Legendre's function $P_n(x)$, A generating function, Recurrence relation, Legendre differential equation, The Rodrigues formula, Bateman's generating function, Hypergeometric forms of $P_n(x)$ Laplace's first integral form, Orthogonality.

Unit -IV

Hermite Polynomials, Recurrence relations, Rodrigues formula, Integrals, The Hermite polynomial as 2^F_0 , Orthogonality.

Text Book:

S. S Trivedi, Special functions, Pragati Prakashan, Meerut, XXI edition, 2021 (Scope as in chapters 3,4,5,6,7)

Reference Book:

M.D. Raisinghania, Ordinary and Partial Differential equations, S. Chand publication, New Delhi , 18th edition, 2013 (Scope as in chapters 9,10,11,12,14)

Bachelor of Science (Honours) Mathematics
Semester–VI
Session 2022 -23
Course Title: Differential Geometry
Course Code: BOML-6335
Course Outcomes

After passing this course, the students will be able to:

CO 1: Able to explain the concept of theory of space curve tangent, normal, binormal and rectifying plane.

CO 2: Able to understand contact between curves and surfaces , locus of centre of curvature, spherical curvature as well as calculate the curvature and torsion of curve

CO 3: Understand the concept of Spherical indicatrix, envelopes, and two fundamental forms,

CO 4: Understand tensor variables, metric tensor, contra-variant, covariant and mixed tensors & and able to apply tensors among mathematical tools for invariance and the reason why the tensor analysis is used and explain usefulness of the tensor analysis.

Bachelor of Science (Honours) Mathematics
Semester–VI
Session 2022 -23
Course Title: Differential Geometry
Course Code: BOML-6335

Examination Time: 3 Hours

Max. Marks: 100

Theory:80

CA:20

Instructions for the Paper Setters:

Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Curves in R^3 : A simple arc, curves and their parametric representation, arc length, contact of curves, tangent line, osculating plane, principal normal, binormal, normal plane, rectifying plane.

Unit-II

Curvature and torsion, Serret-Frenet Formulae, Helics, Evolute and Involute of a parametric curve, Osculating circle and osculating sphere, spherical curves.

Unit –III

Surfaces in R^3 : Implicit and Explicit forms of the equation of surface, two fundamental forms of a surface, Family of surfaces, Edge of regression, Envelops .

Unit -IV

Einstein's summation convention, Transformations of coordinates, Tensor's law for transformation, contravariant, covariant and mixed Tensors, addition, outer product, contraction, inner product and quotient law of tensors, metric Tensor and Riemannian metric.

Text Book:

1. G.S Malik, Differential Geometry, Pragati Prakashan, Meerut , IX edition , 2013 (Scope as in chapters 1-10)

Reference Books:

1. D Somasundaram, Differential Geometry: A first Course, Alpha Science International Limited, New Delhi, 2005 (Scope as in chapters 1,2)

2. C.E Weather burn, Differential Geometry, Cambridge University Press, Cambridge (Scope as in chapters 1,2,3,4)